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ABSTRACT

Provided in this bibliography are annotated lists of social studies of science literature, arranged alphabetically by author in 13 disciplinary areas. These areas include astronomy; general biology; biochemistry and molecular biology; biomedicine; chemistry; earth and space sciences; economics; engineering; mathematics; physics; political science; psychology; and sociology. In addition, each area is cross-indexed by 23 topics of social and organizational interest, permitting users to make quick reference to the range of topics studied within a disciplinary area, as well as to the range of disciplines in which a topic has been explored. Index words in parentheses indicate the principal topics examined in each item. Each of the 285 annotations briefly describes the focus of the book or article and makes note of the data and methods used in the study. In cases where an item deals with more than one discipline, a full annotation appears only once, and subsequent entries refer back to the full annotation. The bibliography concludes with a short section of conceptual and methodological studies with general relevance to the study of disciplines. An index of topics, glossary, and a matrix which classifies the distribution of annotations by discipline and topic are provided at the end of the bibliography. (JN)

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STUDIES OF SCIENTIFIC DISCIPLINES

an annotated bibliography

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STUDIES OF SCIENTIFIC DISCIPLINES

an annotated bibliography

Division of Planning and Policy Analysis
Office of Planning and Resources Management
National Science Foundation
Washington, D.C. 20550

1982

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INTRODUCTION

The impetus for this annotated bibliography derived from the authors' observations of a communication gap between, on the one hand, the managers and practitioners in scientific and engineering disciplines, and on the other hand, the community of social studies of science. Science and engineering managers and policymakers (broadly defined to include both program administrators and advisory committees of practicing scientists and engineers) frequently make resource allocations that affect disciplinary social structure. Such decisions are thoughtfully made, but generally without reference to social studies of science literature related to the problems they are addressing. Conversely, the concerns of those engaged in social studies of science with their models and theories of the behavior of scientists and engineers, sometimes blind them to significant problems and phenomena well known to those who live in the world of the discipline. Their studies are consequently less rich and less useful to the practitioners than they might otherwise be.

The primary objective of this bibliography is to make accessible to the managers and practitioners of science and engineering the findings from the social studies of science in a form that will be useful to them. A secondary and longer-term objective is to create an awareness of an information resource relevant to their activities, and consequently to stimulate additional research. A third objective is to provide a useful resource for those who study social aspects of science. To our knowledge, this bibliography is the first attempt to catalogue and index studies of disciplines. The wide range of studies annotated may stimulate comparative examination of hypotheses.

The roots of one of the authors' interest in these issues go back to his experiences in the mid-1960's in the Social Studies Group of the NASA supported Space Sciences Laboratory at the University of California at Berkeley. NASA Administrator James Webb's hope, in supporting groups of social scientists at academic space science centers, was that their close proximity to the emergence of exciting new space related disciplines would stimulate studies of the dynamics and organization of these activities. Such studies would contribute to an understanding of how to manage research. With this view, Webb expressed confidence in the potential of basic social studies of science to contribute to practical understanding and action.

METHODS

There were two phases in the collection of materials for this bibliography -- the first phase culminated in the Draft Bibliography circulated for suggestion and comment at the November 1979 meeting of the Society for Social Studies of Science (4S) in Washington, D.C. The second phase, during the following 18 months, incorporated many of the suggestions and contributions of the 4S attendees and others, as well as items discovered through additional search.

The Search Process

Studies of scientific disciplines are widely dispersed in the literature. The search procedure throughout was characterized by the "snowball" technique. An initial set of books and articles on social aspects of science was assembled with assistance of knowledgeable NSF staff members and others. These were reviewed in order to identify further references to studies of specific disciplines. Each item identified led, in turn, to other materials. In this manner, by October 1979, over 450 books and articles dealing with disciplines were identified. The articles were obtained from 70 different professional journals. One hundred sixty-five of these items were annotated and indexed for the first draft of the bibliography, with another 100 candidate items awaiting treatment for the next edition. During phase two, an additional 120 items were identified and selected for annotation. These were partly suggested by 4S members and others, and partly derived from further search. In all, the current version of the bibliography contains 285 annotated studies with the latest publication dates extending up to mid-1980. There are nearly 500 entries in the bibliography because many of the studies pertain to more than one discipline.

The Selection Criteria

The principal criterion for the inclusion of an item for annotation was that it present information on some enduring aspect of a science or engineering discipline. Studies treating more ephemeral phenomena, e.g., manpower studies presenting only current figures, are not included. A few seminal conceptual pieces were also included. Another criterion was availability, thus most of the entries are from the published literature though, again, a few unpublished pieces of interest were included.

Several items were generated in the search process which described aspects of interdisciplinary research. At the end of the search process, they were adjudged to be too few to justify the creation of a separate category for interdisciplinary research. On the whole, we believe that insufficient justice was done to well researched pieces from the history of science literature which deal with important social aspects of disciplines. Several have come to our attention since the deadline for the production of the bibliography, and we recommend that future snowballs roll more consciously in the fields of historical case studies and research.

ORGANIZATION AND CONTENTS

The body of the bibliography lists studies of thirteen disciplinary areas which are further cross-indexed by twenty-three topics of social and organizational interest. This permits users to make quick reference to the range of topics studied within a disciplinary area, as well as to the range of disciplines in which a topic has been explored. Within each discipline category, entries are listed in alphabetical order by author. Index words in parentheses indicate the principal topics examined in each item.

Each annotation briefly describes the focus of the book or article, and makes note of the data and methods used in the study. In cases where an item deals with more than one discipline, a full annotation appears only once, and subsequent entries refer back to the full annotation.

The bibliography concludes with a short section of conceptual and methodological studies with general relevance to the study of disciplines.

The decision to structure the primary reference orientation around discipline was designed to meet the needs of the administrator-users. Access to the analytical topics is slightly less convenient, thus an index of topics has been provided.

The Index of Topics and Glossary

The topics listed in the index were compiled from the literature annotated, as well as from general works in the social studies of science. No *a priori* theory guided this compilation, rather it reflects the concerns of the authors of the studies selected. It might well be that a canvas of practitioners and decisionmakers in science and engineering would generate a rather different listing. The terms of the topical index, as used in the bibliography, are defined in the Glossary of Index Terms.

Distribution of Entries by Discipline and Topic

In Appendix I, a matrix is presented which classifies the distribution of annotations by discipline and topic. It highlights areas of coverage, and suggests areas that have not been studied. It may be an accurate indication of patterns of discipline studies, or it may reflect the search procedures. The table indicates that the physical sciences, especially chemistry and physics, have been a focus in several studies. Political science and sociology have also received a high degree of attention. Topics most frequently addressed include paradigm characteristics, and the recognition and reward structure of science.

Selected Readings in the Social Studies of Science

Finally, without any claim to comprehensiveness, Appendix II lists a few general works concerned with the scope and nature of the social study of science.

ASTRONOMY

Astr 1

Brush, Stephen G. "Looking Up: The Rise of Astronomy in America," American Studies, 20 (no. 2, 1979).

(development of disciplines and specialties; funding of research)

Relates the rise of American astronomy to the presence of important astronomers who played major organizational roles in addition to contributing major scientific work. The following factors are also considered: "openness of discipline to bright energetic people lacking professional qualifications, early emphasis on practical skills and technology followed by increasing theoretical competence, availability of substantial funds, ability to organize research teams, and the use of women." The author suggests "that the success of astronomy encouraged Americans to develop high-quality research programs in other areas of physical science." Includes a section on survey of significant innovations in astronomy from 1951-1975 and the role of Federal funding.

Astr 2

Edge, David O. and Mulkay, Michael J. Astronomy Transformed: The Emergence of Radio Astronomy in Britain. New York: John Wiley and Sons, 1976.

(development of disciplines and specialties; discipline comparisons)

Case study of the emergence and growth of radio astronomy in Britain focuses on three broad questions: How did radio astronomy emerge as an identifiable area of study? What was the sequence of scientific developments? Were scientific developments accompanied by discernable changes in social relationships? Emphasizes the interaction of social, technical and intellectual factors in the growth of the specialty. Study is based on review of research papers, symposia and conferences; historical and biographical writings; citation analysis; examination of patterns of professional association. Includes comparison with case studies of five other scientific specialties: psychology, phage biology, X-ray protein crystallography, physical chemistry.

Astr 3

Gieryn, Thomas F. "Demography of Problem Areas in Astronomy, 1950-75," paper presented at the Forth Annual Meeting of 4S, Washington, D.C. November, 1979.

(productivity—age; development of disciplines and specialties)

"Analysis of the growth of radio and x-ray astronomy in the 1960's suggests that future reductions in the size of entering cohorts of new doctorates in astronomy may lengthen the time needed to exploit future innovations or breakthroughs. Most of the scientists making up the early growth of these two problem areas had recently earned their Ph.D.'s and, it was found, the probability of initiating research in radio or x-ray astronomy declined with the age of the scientist. Since smaller entering cohorts of new doctorates would imply an overall aging of the astronomical community, the rate at which scientists will move in to exploit future innovations will be slower than during the period of peak growth during the 1960's." (Author's abstract.)

Astr 4

Hirsh, Richard F. Science, Technology and Public Policy: The Case of X-Ray Astronomy, 1959 to 1972. Ph.D. dissertation, University of Wisconsin (Madison), 1979.

(development of disciplines and specialties; funding of research)

Examines the evolution of x-ray astronomy as a scientific specialty, with focus of the roles of technological innovation and American public policy. U.S. government encouragement of new research in space during the post-Sputnick period stimulated investigations in x-ray astronomy. Increased funding to pay for expensive experiments drew many new investigations to the field (especially cosmic ray, gamma ray, and nuclear physicists). The dissertation examines the relationship between advances in research technology and growth in conceptual understanding, and discusses the affect of dependence on increasingly sophisticated and expensive experimental tools. With loss of political support for space exploration, "recent research in x-ray astronomy has lost a sense of continuity and has produced discontent among many participants." (From author's abstract.)

Astr 5

Irvine, John and Martin, Ben R. "The Economic Effects of Big Science: The Case of Radio Astronomy," unpublished paper. University of Sussex: Science Policy Research Unit, January 1980.

(funding of research; postgraduate education; career patterns)

Identifies and evaluates some of the economic benefits associated with research in radio astronomy. Five forms of technological spin-off are discussed. Manpower-training benefits are examined through a survey of over 200 former post graduate students from the two British radio-astronomy laboratories. The authors find "(t)he empirical results presented . . . suggest that manpower-training benefits have probably been more important than technological spin-off." Criteria for the funding of "big science" are discussed.

Astr 6

Kruytbosch, Carlos with Papenfuss, Susan. "Some Social and Organizational Characteristics of Breakthrough Science: An Analysis of Major Innovations in Four Fields of Science, 1950-1976," paper presented at the IX World Congress of Sociology, Uppsala, Sweden, August 17, 1978. (Washington, D.C.: National Science Foundation, Planning and Policy Analysis Office)

(discovery process; funding of research; discipline comparisons)

Identifies 85 advances in the disciplines of astronomy, chemistry, earth sciences and mathematics, and examines the role of the National Science Foundation in funding research that led to the advances. Data suggest that for the period discussed, NSF support of the innovations ranged from 50% in mathematics, 35% in earth sciences, and 29% in astronomy to 12% in chemistry. These figures match or exceed the NSF portion of total Federal support for basic research in these fields. The study included comparisons of funding sources for the four disciplines, and of the work settings in which the innovations were produced.

Astr 7

Lankford, John. "Amateur Versus Professional: The Transatlantic Debate Over the Measurement of Jovian Longitude," Journal of the British Astronomical Association, (October, 1979), 574-82.

(social stratification; competition; national comparisons)

"After 1880 professionalization played a key role in the transformation of astronomy. One major consequence involved was the redefinition of the status of amateurs. The process of redefinition was illustrated by the debate between Professor George Washington Hough, an American professional, and the British amateur Arthur Stanley Williams. A number of parameters were involved: amateurs concentrated mainly on observation and description, but professionals had more complex goals. In the USA planetary studies were a professional area and involved the use of large refractors. In the UK the planets were studied by amateurs using small telescopes. Hough and Williams clashed specifically over Jupiter and the transits of its features. They debated the use of micrometers compared with estimates by eye, and the results which followed from these methods. This paper traces the antagonism, and its resolution when the American astronomers began to concentrate on the 'new astronomy' (astrophysics) leaving, for the most part, planetary observations in the hands of amateurs." (Author's abstract.)

Astr 8

Martin, B. R. "Radio Astronomy Revisited: A Reassessment of the Role of Competition and Conflict in the Development of Radio Astronomy," Sociological Review, 26 (1978), 27-56.

(development of disciplines and specialties; competition)

Traces competition between radio and optical astronomers, and between different groups of radio astronomers, in the development of radio astronomy. Competition is found in many facets of research, including techniques, data interpretation, and theoretical stance. Unusual features of "big science" radio astronomy--especially the predominance of two research groups (Cambridge and Jodrell Bank)--may encourage the development of converging interests and cooperation, but elements of conflict and controversy are present, and are seen as a productive factor in scientific development.

Astr 9

Mulkay, Michael. "Conceptual Displacement and Migration in Science: A Prefatory Paper," Science Studies, 4 (July, 1974), 205-34.

(career patterns; performance of research)

Studies the movement of scientists from one research area to another, and examines the corresponding changes in social relationships and research activities (how skills and concepts are applied in new fields). Discusses five individual cases (solar physics to zoology; physics to radar meteor astronomy to geophysics; radar meteor astronomy to glaciology; zoology to psychology; engineering to bioengineering). A case study of British radio astronomy examines frequency of migration, and factors that affect the rate and range of movement in that specialty.

Astr 10

Osterbrock, Donald E. "The California-Wisconsin Axis in American Astronomy," Sky and Telescope, 51 (1976), 9-14, 91-97.

(funding of research; career patterns; graduate education)

Examines the "astronomical association" between California and Wisconsin that reflects the growth of astronomical research and education. Reviews the development of facilities for observational astronomy and their connections with university astronomy programs, and traces the movement of scientists and students from observatories and universities in one state to those in the other.

Astr 11

Wade, Nicholas. "Discovery of Pulsars: A Graduate Student's Story," Science, 189 (August 1, 1975), 358-64.

(discovery process; recognition and reward)

Discusses the discovery of pulsating radio stars (1967) and the controversy surrounding the Nobel Prize awarded in 1974. Debate over recognition due the graduate student, who first noticed a record of unexplained signals, centers on different interpretations of her work: was it routine scanning, or a unique contribution beyond the framework of the project?

Astr 12

Warner, Deborah Jean. "Astronomy in Antebellum America," in The Sciences in the American Context: New Perspectives, Nathan Reingold (ed.) Washington, D.C.: Smithsonian Institution Press, 1979.

(development of disciplines and specialties; funding of research; competition)

Traces the growth of astronomy in antebellum America to rising expectations for discovery and explanation. Promising (European) technological innovations contributed to the development of physical astronomy, which competed with theoretical and practical astronomy for talent and observation time. The period reflects professional and academic recognition of astronomy as a discipline, and is marked by increasing public support for the science.

Astr 13

Woolgar, S. W. "The Identification and Definition of Scientific Collectivities," in Perspectives on the Emergence of Scientific Disciplines, G. Lemaine et al. (eds.) Chicago: Aldine, 1976.

(development of disciplines and specialties)

Examines three broad questions concerned with the identification and definition of "scientific collectivities": (1) What is the meaning of the various terms (discipline, specialty, field, problem area) used to describe research collectivities and intellectual groupings? (2) How do particular concepts of scientific collectivities relate to techniques for identifying these collectivities? (3) What are the theoretical implications of particular ways of conceptualizing scientific collectivities? Discusses different techniques for identifying collectivities (analysis of scientific literature; surveys of scientists; on the basis of location, common techniques or equipment). Focuses in particular on the application of five analysis techniques to the literature of research on pulsars, and finds that the different techniques may identify different populations of researchers. Suggests that there is a need to explore the nature of the connection between sociological research procedures and the subsequent findings.

Astr 14

Woolgar, S. W. "Writing an Intellectual History of Scientific Development: The Use of Discovery Accounts," Social Studies of Science, 6 (September, 1976), 395-422.

(discovery process; development of disciplines and specialties)

Case study of the discovery of pulsars examines the use of personal accounts to describe the development of scientific specialties, and discusses the difficulties of this approach to the study of breakthroughs in science.

BIOLOGY, GENERAL

Biol 1

Allison, Paul D. and Stewart, John A. "Productivity Differences Among Scientists: Evidence for Accumulative Advantage," American Sociological Review, 39 (August, 1974), 596-606.

(productivity—age; discipline comparisons)

Data on academic scientists in biology, mathematics, chemistry and physics (including questionnaire responses, citation measures, departmental prestige ratings, published biographical information) are examined to determine the relationship between career age and productivity. Evidence supports a hypothesis of accumulative advantage: recognition and access to resources increases the productivity of highly productive scientists, and the lack of them decreases the productivity of low producers. The distribution of productivity becomes increasingly unequal as career age increases. Productivity patterns for the disciplines are similar, with the exception of biology. Differences might be attributable to the fragmention of academic biology and of biology journals, and to the lower degree of consensus over method and theory in biology.

Biol 2

Anderson, Richard C; Narin, Francis and McAllister, Paul. "Publication Ratings versus Peer Ratings of Universities," Journal of the American Society for Information Science, 29 (March, 1978), 91-103.

(university ratings; discipline comparisons)

Compares ratings of universities obtained by citation analysis to peer ratings of graduate programs. A high correlation is found between peer ratings and measures of publications. Further analysis suggests that the overall prestige of a university affects the peer ratings of its departments. Disciplines covered include biological sciences, chemistry, mathematics, physics and psychology.

Biol 3

Barber, Bernard and Fox, Renee C. "The Case of the Floppy-Eared Rabbits: An Instance of Serendipity Gained and Serendipity Lost," American Journal of Sociology, 64 (September, 1958), 128-36.

(discovery process)

Examines, through focused interviews, the case of two research scientists who independently observed the same phenomenon: reversible collapse of rabbits' ears after injection by an enzyme (papain). One scientist went on to a discovery based on the chance occurrence (his breakthrough came in a teaching situation); the other scientist, pursuing other leads, did not examine the phenomenon, but used it as a test of the strength of the enzyme solution. The case study illuminates the "process of scientific discovery, in particular the 'serendipity' pattern that is not revealed in formal scientific reports."

Biol 4

Cohen-Shanin, N. Innovation and Citation. (Monograph) The National Council for Research and Development, Prime Minister's Office, Jerusalem, Israel, June 1975.

(structure of literature—citation rates)

"After a general discussion of the pitfalls of unstandardized citation counting as a measure of quality, the author describes her own test: 200 papers published 1959-1966 on plant physiology were categorized by 2 plant physiologists as: primary findings (PF), primary empirical evidence (PEE), empirical reinforcement (ER) or non-contributing (NC). PF and PEE papers formed the 'innovative' category; PF, PEE and ER papers formed the 'contributing' category. Individual growth curves were plotted for each paper and the citation rate (excluding self-citation) determined for the peak year as well as for two years before and after. Citation rates and peer evaluations were then correlated. Innovative papers are more highly cited than non-innovative, contributing higher than non-contributing, the author therefore supports the use of citation analysis for the evaluation of scientific papers." (From Citation Analysis: An Annotated Bibliography, S. Cozzen, et. al. Philadelphia: Institute for Scientific Information, May, 1978.)

Biol 5

Frame, J. Davidson; Narin, Francis and Carpenter, Mark P. "The Distribution of World Science," Social Studies of Science, 7 (November, 1977), 501-16.

(structure of literature; national comparisons; discipline comparisons)

Applies citation analysis to international scientific literature in order to survey national differences in research activities in eight fields (clinical medicine, biomedical research, biology, chemistry, physics, engineering and technology, earth and space sciences, and mathematics). Publication output in the fields, when ranked by nation, corresponds well with the record of Nobel Prize recipients in scientific areas. Five patterns for production of national science are identified, characterized by different research emphasis: emphasis on clinical medicine (30 countries, including US and UK); emphasis on physical science (15 countries, including Japan and Eastern Europe); balanced distrubution between biological and physical science (4 countries, including Germany and France); emphasis on biological research (4 Third World countries), emphasis on medical research, with a large component of biological research (5 countries).

Biol 6

Friedlander, Frank. "Performance and Orientation Structure of Research Scientists," Organizational Behavior and Human Performance, 6 (March, 1971), 169-83.

(performance of research; discipline comparisons)

Study of 178 research scientists in six Naval R&D laboratories assesses their research orientation, professional orientation and local orientation. Disciplines represented are chemistry, engineering, physics, physiology, psychology and mathematics. Significant disciplinary differences are found in both research and professional orientation, but not in local orientation. Understanding of the different orientations and their distinct functions is important to the evaluation of performance in scientific organizations.

Biol 7

Gaston Jerry. The Reward System in British and American Science. New York: John Wiley and Sons; 1978.

(recognition and reward; paradigm characteristics; discipline comparisons; national comparisons)

Examines the effect of different levels of cognitive development, and different social organization, on the reward system in science. Biographical information and publication records of 6 groups of scientists (100 each in physics, chemistry and biology in Britain, and in the U.S.) provide data on productivity, recognition and prestige. Comparison of data by disciplines, and by nationality, identifies six patterns of reward, which reflect disciplinary differences in degree of codification and national differences in the organization of research.

Biol 8

Hagstrom, Warren O. "Competition in Science," American Sociological Review, 39 (February, 1974), 1-18.

(competition; discipline comparisons)

A sample of over 1700 academic scientists active in research in 35 specialties (in biology, chemistry, mathematics and physics) provides data for a study of competition in science. Questionnaires, interviews, bibliographic and biographic materials are analyzed to determine individual experiences of competition, and patterns of competition within specialties. More than 60% of the scientists report having been anticipated at least once in their career. Individual and disciplinary differences in rates of anticipation and concern about anticipation are examined. Positive and negative functions of competition are outlined.

Biol 9

Hagstrom, Warren O. "Factors Related to the Use of Different Modes of Publishing Research in Four Scientific Fields," in Communication Among Scientists and Engineers, Carnot E. Nelson and Donald K. Pollock (eds.) Lexington, Massachusetts: D. C. Heath and Company, 1970.

(information exchange; discipline comparisons)

Compares communication practices in four fields of academic science: mathematics, chemistry, physics and biology. Factors considered include book and article productivity, distribution practices for reprints and preprints, and publication of abstracts prior to finished articles. Different communication patterns are described for each field, and are examined in greater detail through analysis of communication characteristics in 46 specialties within the four fields.

Biol 10

Hagstrom, Warren O. "Forms of Scientific Teamwork," Administrative Science Quarterly, 9 (December, 1964), 241-63.

(performance of research; discipline comparisons)

Compares traditional and modern forms of scientific teamwork, and examines differences in research in the disciplines of mathematics, physics, chemistry and biology. Traditional forms involve free collaboration of peers, or professor-student relationships; modern forms are marked by division of labor and centralization of authority. A case study of practices at the University of California (Berkeley) examines the rate of change from traditional to modern forms of basic research. Three questions are posed: "(1) How frequently do scientists work in organized teams in which one professional is formally subordinated to another? (2) How frequently do scientific teams include professional technicians on a more or less permanent basis? (3) How frequently is interdisciplinary research organized on a continuing basis?" Disciplinary differences (with physicists reporting the highest percentage of team research, followed by chemists, biologists, mathematicians) underline the importance of looking at a range of scientific efforts when examining issues in science. The author concludes "we do not obtain evidence to suggest that bureaucratic forms of organization are rapidly displacing traditional forms . . . it is more reasonable to suppose that many types of research proceed most effectively in traditionally organized groups, and will continue to do so for the indefinite future."

Biol 11

Hagstrom, Warren O. "Inputs, Outputs, and the Prestige of American University Science Departments," Sociology of Education, 44 (Fall, 1971), 375-97.

(university ratings; discipline comparisons)

Studies 125 departments in biology, chemistry, mathematics and physics in order to determine correlates with department prestige rankings. Data from questionnaires, published biographies, and the Science Citation Index are examined. Among the factors found to have large and significant correlations with prestige are: department size, research production (number of published articles), research opportunities (grant support, time for research), student characteristics, faculty educational background, faculty awards and offices. Differences in correlates of prestige are small among the four fields studied: in biology there is a higher correlation with department size than there is in the other fields; in mathematics there is a smaller correlation with department size, number of post-doctoral fellows and service on advisory committees than there is in the other fields. Departments with high prestige ratings seem to be more active in informal communication channels (reprint distribution, service on advisory committees).

Biol 12

Hagstrom, Warren O. "The Production of Culture in Science," American Behavioral Science, 19 (July/August, 1976), 753-68.

(performance of research; paradigm characteristics; discipline comparisons)

Traces the relationship between the subject matter of scientific specialties and the structure of research groups. The study focuses on biology, chemistry, mathematics and physics. Field differences in the organization of work groups are examined (size, collaboration, technological development, degree of routine, division of labor), and related to the degree of uncertainty in a field. Discusses coordination of activity among work groups and network clusters, and examines the role of formal and informal communication.

Biol 13

Hagstrom, Warren O. The Scientific Community. New York: Basic Books, 1965.

(recognition and reward; competition; performance of research; discipline comparisons)

Examines the influence of scientific colleagues on one another's work, and discusses how this social influence operates to produce conformity to scientific norms and values. Interviews with ninety scientists provide data that is supplemented by statistics from earlier surveys of scientists. The sample of mathematicians, physicists, experimental biologists and chemists includes many eminent scientists and "formal leaders" (department chairmen, university officials, journal editors, etc.) Among the issues analyzed are: the function of recognition; competition for recognition; organization of research; functional differentiation between and within disciplines; the conduct of controversy.

Biol 14

Marshall, Louise H. "Maturation and Current Status of Neuroscience: Data from the 1976 Inventory of US Neuroscientists," Experimental Neurology, 64 (1979), 1-32.

(development of disciplines and specialties)

Analysis of data from a 1976 survey of neuroscientists and from related earlier surveys (1969, 1974) traces the growth of neurosciences (the correlated study of brain and behavior). Demographic data include measures of highest earned degrees (shows an increasing proportion of Ph.D.s and a decreasing proportion of M.D.s); professional status and age; proportion of minority and women scientists; undergraduate educational background (predominantely biosciences and psychology). Sociological data include statistics on the distribution of work activities (administration, teaching, research, clinical practice); place of employment; and funding of research. Data on specialization reviews the major subfields of neurosciences, and illustrates patterns of training for current research. The difficulties of measuring growth in interdisciplinary research areas are discussed.

Biol 15

McAllister, Paul R.; Anderson, Richard C. and Narin, Francis. "Comparison of Peer and Citation Assessment of the Influence of Scientific Journals," Journal of the American Society for Information Science, (May, 1980), 147-52.

(structure of literature--journal influence; discipline comparisons)

"A survey was undertaken to ascertain the extent of agreement between scientists' subjective assessment of the average influence per article for articles in 58 different scientific journals, when compared with corresponding citation influence ratings for articles in the same journals. The scientists' assessments were derived from questionnaires sent to faculty at 97 American universities covering journals in ten different research fields. A strong positive relationship was found to exist between the scientists' assessment of journal influence and the citation influence ratings." (From authors' abstract.) Fields included in the study are: biochemistry, botany, chemistry, electrical engineering, entomology, geoscience, mathematics, pharmacology, physics and psychology.

Biol 16

Meltzer, Leo and Salter, James. "Organizational Structure and the Performance and Job Satisfaction of Physiologists," American Sociological Review, 27 (June, 1962), 352-62.

(discipline organization; productivity)

Survey of almost 4,000 physiologists identifies 704 who are employed full time in research institutes or organizations. Data are examined to determine how organizational structure (size of organization, number of professional levels) is related to productivity (papers published) and job satisfaction.

Biol 17

Menzel, Herbert. "Planned and Unplanned Scientific Communication," in The Sociology of Science, Bernard Barber and Walter Hirsch (eds.) New York: The Free Press of Glencoe, 1962.

(information exchange)

Examines patterns of information exchange of biochemists, chemists and zoologists at an academic institution. Interviews with the scientists had the following objectives: to distinguish types of information needs; to examine the means and occasions of information exchange; to analyze characteristics of the specialty, institution, and personal outlooks as possible conditions which influence needs for information and opportunities for satisfying them.

Biol 18

Mok, Albert and Westerdiep, Anne. "Societal Influences on the Choice of Research Topics," in Social Processes of Scientific Development, Richard Whitley (ed.) London and Boston: Routledge & Keegan Paul, Ltd., 1978.

(performance of research)

Study of environmental biologists in the Netherlands examines external influences on the choice of research topics, and explores possible dissonance between the norms of the scientific community and scientists' political engagement (concern with societal problems). A questionnaire returned by over 120 environmental biologists provides information on preference for ecological or general research; lectures and writings for the lay public; participation in environmental groups; and tendency to evaluate research projects in societal rather than pure research terms. The data suggest that "an increase in moral concern for the well being of society" does not diminish orientation toward the scientific community--rather, the two may represent separate dimensions, and may strengthen each other.

Biol 19

Mullins, Nicholas C. "The Distribution of Social and Cultural Properties in Informal Communication Networks Among Biological Scientists," American Sociological Review, 33 (October, 1968), 786-97.

(information exchange)

Study of informal communication in bioscience identifies and examines a communication network. An initial survey of a random sample of 50 scientists, followed by successive surveys of their identified communicants, resulted in 257 participants who provided data on information exchange. The structure of informal communication networks among biological scientists is found to be closely associated with "cultural factors," defined to be scientists' descriptions of their research and the orientations underlying those descriptions. The following factors had no correlation with information networks: social status of scientists; formal structures of department, discipline or research organization.

Biol 20

Mullins, Nicholas C. et. al. "The Group Structure of Co-citation Clusters: A Comparative Study," American Sociological Review, 42 (August, 1977). 552-62.

(structure of literature--specialty groups)

Two clusters of highly co-cited literature in biological science identify two groups of scientists, who are related (in each group) through the citation of their papers together in the work of other scientists. Questionnaires, interviews, and citation patterns of the scientists identified provide data for an examination of the intellectual and social structures of the two groups (one of 105, one of 65 scientists). The data suggest that such clusters of inter-related literature do represent intellectual developments, and that the authors in such clusters show patterns of social ties that characterize specialty groups.

Biol 21

Narin, Francis. Evaluative Bibliometrics: The Use of Citation Analysis in the Evaluation of Scientific Activity. New Jersey: Computer Horizons, Inc., 1976.

(structure of literature--journal influence; discipline comparisons)

Reviews the development of publication and citation counting techniques, and examines studies correlating literature based measures with other measures of quality and quantity of scientific output. Focuses on "influence methodology," a procedure for calculating the influence of individual journals. This technique facilitates the use of citation analysis to determine characteristics of aggregates of papers (representing departments, disciplines, schools, journals, nations, etc.) "Influence maps" describe patterns of influence for journals in biology, chemistry, physics, engineering, psychology, mathematics, earth and space sciences. The volume includes a glossary and extensive bibliographies.

Biol 22

Narin, F; Carpenter, M. P. and Berlt, N. C. "Inter-relationships of Scientific Journals," Journal of the American Society for Information Science, 23 (no. 5, 1972), 323-31.

(structure of literature; discipline comparisons)

"The patterns of cross-citing among 275 journals in mathematics, physics, chemistry, biochemistry, and biology are 'mapped', showing clear boundaries between fields and subfields. . . The maps document the existence of several levels of journals for each field, from the outstanding or highly cited and highly self-citing in which information originates, to lesser and lesser cited journals which rely upon the more preferentially cited. . . . In constructing maps, highly interactive journals will naturally be grouped together, and thus mapping also indicates crude clustering corresponding to subfields. Cross-field journals can also be located, by mapping interacting clusters instead of individual journals. These maps support the intuitive hierarchy of fields; math to physics to chemistry to biochemistry to biology." (From Citation Analysis: An Annotated Bibliography, S. Cozzens, et. al. Philadelphia: Institute for Scientific information, May, 1978.)

Biol 23

Nelkin, Dorothy. "Scientists and Professional Responsibility: The Experience of American Ecologists," Social Studies of Science, 7 (February, 1977), 75-95

(attitudes and values; development of disciplines and specialties)

Examines the effect of the environmental movement on the discipline of ecology in the US and investigates "tensions between public activity and the traditional norms of the scientific community--between the social obligations of scientists to influence the use of science and their professional obligation to protect the integrity and development of their discipline."

Biol 24

O'Rand, Angela. "Professional Standing and Peer Consultation Status among Biological Scientists at a Summer Research Laboratory," Social Forces, 55 (June, 1977), 921-37.

(social stratification; information exchange)

Study of 120 scientists conducting research at the Woods Hole Marine Biological Laboratory during the summer of 1972 compares individual professional standing (based on honors and awards, professional position) to consultation status (based on the number of times a scientist is named by others as a contact). Variables considered to influence the two measures are: age, prestige of Ph.D. department, current academic affiliaton, publication rates and citation rates. Data suggest that although professional standing and consultation status are ultimately related, they stem from different sets of antecedent conditions, and represent distinct forms of scientific recognition.

Biol 25

Pfeffer, Jeffrey; Salancik, Gerald R. and Moore, William L. "Archival Indicators of Paradigm Development of Academic Disciplines," unpublished paper, School of Business Administration, University of California, Berkeley (first author), March, 1979.

(paradigm characteristics; graduate education; discipline comparisons)

Examines possible indicators of paradigm development in academic science: length of dissertation abstracts; total length of dissertations; length of course chaining in department curricula. Studies conducted in 20 departments each at the University of Illinois (Urbana-Champaign) and the University of California (Berkeley) show significant correlation between departmental course chain length and a random sample of dissertation and abstract lengths. Rankings of departments, based on these indicators of paradigm development, are similar for both universities. Scientific disciplines included in the study are: anthropology, biology, chemistry, economics, engineering, geography, geology, mathematics, physics, political science, psychology, sociology.

Biol 26

Roe, Anne. The Making of A Scientist. New York: Dodd, Mead and Company, 1952.

(discovery process; discipline comparisons)

An early study in the psychology of science provides data from tests and interviews of 64 eminent scientists in biology, physics, anthropology and psychology. Discusses patterns in their life histories, intellectual abilities, and personality structures which seem to be "more characteristic of scientists . . . than of people at large." Some characteristics may be related to specific fields of study.

Biol 27

Smith, Bruce L. R. and Karlesky, Joseph J. The State of Academic Science: The Universities in the Nation's Research Effort. New York: Change Magazine Press, 1977.

(graduate education; funding of research; discipline comparisons)

Includes a chapter on Current Developments in Academic Science and Engineering that reviews five fields: chemistry, physics, life sciences, mathematics and engineering. Information from site visits is combined with reviews by authorities in each field. Broad generalizations tend to obscure differences among fields, but the data seem to show that less highly rated departments are the first to suffer from declines in funding. At present, first rank research departments show continued research vitality in their fields. Several dimensions are considered for each field: trends in research funding and the implications of a tightened funding environment; graduate enrollments; evolving manpower situation; summary of site visits.

Biol 28

Storer, Norman. "Relations Among Scientific Disciplines," in *The Social Contexts of Research*, Saad Z. Nagi and Ronald G. Corwin (eds.) New York: Wiley Interscience, 1972.

(paradigm characteristics; recognition and reward; discipline comparisons)

Suggests that relations among scientific disciplines are indicators of "the internal dynamics of scientific enterprise." Examines differences between the "hard" and "soft" sciences, between basic and applied research, and discusses the effect of these differences on professional recognition. Characteristics of disciplines are compared, and the differences discussed include: demographic differences, occupational differences, economic differences, "psychological" differences, organizational differences. Discusses cooperation and competition among disciplines. Data are drawn from biology, chemistry, physics, mathematics, earth and space sciences, economics, sociology, political science and psychology.

Biol 29

Whitley, Richard D. "Communication Nets in Science: Status and Citation Patterns in Animal Physiology," *Sociological Review*, 17 (no. 2, 1969), 219-33.

(social stratification)

Study of social stratification in animal physiology focuses on two groups of authors: high prestige/high power and low prestige/no power. All the scientists studied are members of the American Physiological Society. Citations received in the *Annual Review* are used as a measure of prestige, and referee-ship for core discipline journals is used as a measure of power. Analysis of Science Citation Index citation rates for the two groups of authors suggests a high degree of polarization in the formal communication system, with the two groups showing distinct differences in publication rates, self-citation rates, citation by APS members, journal source of citations received, and cross-group citations.

Biol 30

Yoels, William C. and Yoels, Brenda G. "The Structure of Scientific Fields and the Allocation of Editorships on Scientific Journals," *Sociological Quarterly*, 15 (Spring, 1974), 264-76.

(paradigm characteristics; recognition and reward; discipline comparisons)

for annotation see Socl 63

Biol 31

Zuckerman, Harriet A. "Patterns of Name Ordering Among Authors of Scientific Papers: A Study of Social Symbolism and its Ambiguity," American Journal of Sociology, 74 (November, 1968), 276-91.

(recognition and reward; performance of research; discipline comparisons)

Examines variations in the name ordering on multi-author research papers in biology, chemistry, and physics, and discusses the effect of team research on the evaluation and reward system in science, which is geared to recognition of the individual. Finds that certain patterns of name ordering are adopted by eminent scientists more often than by others (in particular, Nobel laureates give credit to co-workers increasingly as their eminence grows). Preference for name order differs by field, and among scientists at different stages of the scientific career. Author suggests that such differences indicate attempts "to integrate more effectively the functional requirements of research groups and the evaluation system of science."

Biol 32

Zuckerman, Harriet and Merton, Robert. "Age, Aging and Age Structure in Science," in The Sociology of Science, Robert K. Merton. Chicago: University of Chicago Press, 1973.

(productivity--age; paradigm characteristics; discipline comparisons)

Section on "Age Stratification and the Codification of Scientific Knowledge" outlines different degrees of codification in different fields, and explores the "relation between codification and age patterned behavior" in scientific discovery, responsiveness to new ideas, and visibility of scientific contributions. Includes some discussion of the fields biology, physics, mathematics, chemistry, sociology and psychology, although the exploratory nature of the paper does not provide for detailed analysis.

BIOCHEMISTRY AND MOLECULAR BIOLOGY

Bioc 1

Bayer, Alan E. and Dutton, Jeffrey E. "Career Age and Research-Professional Activities of Academic Scientists," Journal of Higher Education, 48 (May/June, 1977), 259-82.

(productivity--age; discipline comparisons)

Examines the relationship of age to performance in science, in order to develop data for discussions of faculty tenure and early retirement policies. Reviews earlier studies of age and achievement, and refines their approaches by including several measures of research and professional activities to be compared to age. Models of age relationships are derived and applied to seven academic disciplines: physics, biochemistry, earth science, chemical engineering, psychology, economics, sociology. Results "demonstrate that any findings based on one discipline may not be applicable to others, and that results based on an aggregate of members from several disciplines may not be applicable to any single field." Although the models suggest that there may be some generational effects (attributable to different experiences of different generations or cohorts of scientists), and selective-attrition effects related to aging, in general career age of academic scientists is found to be a poor indicator of research-professional activity.

Bioc 2

Bayer, Alan E. and Folger, John N. "Some Correlates of a Citation Measure of Productivity in Science," Sociology of Education, 39 (Fall, 1966), 381-90.

(productivity)

467 scientists who received Ph.D.s in biochemistry in 1957 and 1958 provide the sample for a study that examines measures of scientific accomplishment derived from citation counts. Factors considered are: quality of Ph.D. granting institution IQ scores of the scientists, and the number of cited works and citations listed in the 1964 Science Citation Index for 27 biochemical journals. A positive correlation is found between quality of graduate school and number of citations, but no relation is found between IQ and number of citations.

Bioc 3

Carpenter, M. P. and Narin, F. "Clustering of Scientific Journals," Journal of the American Society for Information Science, 24 (no. 6, 1973), 425-36.

(structure of literature—specialty groups; discipline comparisons)

Constructs and examines clusters of cross-citing journals in physics, chemistry and molecular biology. Suggests that the clusters identify research specialties or national-language groups. Relationships among subfields within the three disciplines are illustrated by citation links between specialty clusters. (This annotation is drawn from Citation Analysis: An Annotated Bibliography, S. Cozzens, et. al. Philadelphia: Institute for Scientific Information, May, 1978.)

Bioc 4

Cole, Stephen. "Scientific Reward Systems: A Comparative Analysis," in Research in Sociology of Knowledge, Sciences and Art. Robert A. Jones (ed.) Greenwich, Connecticut: JAI Press, Inc. 1978.

(recognition and reward; paradigm characteristics; discipline comparisons)

Examines the operation of the reward system in four scientific disciplines (biochemistry, chemistry, psychology and sociology) to determine if universalistic standards, found in an earlier study of physics, operate in other fields. Data gathered on 60 scientists in each of the disciplines is the basis for an analysis of the correlation between quantity and quality of scientific output and the distribution of rewards. The data suggest that in all 5 fields "quality of work as perceived by other scientists is the most important variable in determining the allocation of rewards." Differences in field codification do not appear to have a strong influence on the reward system.

Bioc 5

Cole, Stephen; Cole, Jonathan and Dietrich, Lorraine. "Measuring the Cognitive State of Scientific Disciplines," in Toward a Metric of Science, Y. Elkana, et. al. (eds.) New York: John Wiley and Sons, 1978.

(paradigm characteristics; discipline comparisons)

Authors suggest that science indicators may be refined through a clearer understanding of qualitative and quantitative differences between fields. Their chapter reports results of research aimed at defining and measuring aspects of intellectual consensus in scientific disciplines. Includes sections on measuring codification; field differences in consensus; mapping the fine structure of research areas. Examples from physics, sociology, chemistry, biochemistry, mathematics, psychology and geology are compared.

Bioc 6

Cole, Stephen; Rubin, Leonard and Cole, Jonathan R. Peer Review in the National Science Foundation: Phase One of a Study. Washington, D.C.: National Academy of Science, 1978.

(funding of research; discipline comparisons)

Study of the peer review process at the National Science Foundation, with focus on ten programs: algebra, anthropology, biochemistry, chemical dynamics, ecology, economics, fluid mechanics, geophysics, meteorology, solid state physics. The study is based on interviews with 70 scientists involved at all points in the peer review system; quantitative data on 1200 NSF grant applicants (half successful and half unsuccessful); material in 200 NSF proposal files. The factors examined include the role of the program director at several stages of the decision making process; the relation between reviewer and applicant characteristics; the influence of applicant characteristics on ratings and decisions.

Bioc 7

Edge, David O. and Mulkay, Michael J. Astronomy Transformed. New York: John Wiley and Sons, 1976.

(development of disciplines and specialties; discipline comparisons)

for annotation see Astr 2

Bioc 8

Griffith, Belver C. and Mullins, Nicholas C. "Coherent Social Groups in Scientific Change," Science, 177 (September 15, 1972), 959-64.

(development of disciplines and specialties; discipline comparisons)

Studies six "small, coherent, activist groups that had major impacts on their home disciplines" of mathematics, physics, biology, psychology and sociology. The groups in quantum physics, algebra, and audition research are described as "elite": divergent but recognized as central to the discipline. Groups in phage biology, operant conditioning, and ethnomethodology are "revolutionary": in opposition to a better established group or discipline. The groups are characterized by high levels of organization and communication, identifiable intellectual and organizational leaders, and association with a particular location. Recruitment (especially of young, uncommitted scientists), the development of a definitive program statement, and access to resources, are necessary to a group's continued existence. Groups usually last 10-15 years. Institutionalization (as a department or departmental slot) ends the group as a distinct social and intellectual entity.

Bioc 9

Judson, Horace Freeland. The Eighth Day of Creation: Makers of the Revolution in Biology. New York: Simon and Schuster, 1979.

(discovery process; development of disciplines and specialties)

"An historical account of the chief discoveries of molecular biology, of how they came to be made, and of their makers." The author states that the work "is not a history of scientific ideas in the abstract but of scientists in the process of discovery . . . In the act of discovery, ideas and personal styles fuse." The book is based on interviews with over 100 scientists with repeated interviews of 32 central figures, and on published and unpublished material including original laboratory notebooks.

Bioc 10

Kohler, Robert E. "Walter Fletcher, F. G. Hopkins, and the Dunn Institute of Biochemistry: A Case Study in the Patronage of Science," ISIS, 69 (September, 1978), 331-55

(funding of research; development of disciplines and specialties)

Examines the founding of the Dunn biochemistry laboratory at Cambridge University (1924), which helped establish biochemistry as an independent university discipline allied to biology rather than medicine. The roles of biochemist F. G. Hopkins and Medical Research Council secretary Walter Fletcher are discussed against the general social background of post World War I Britain--the increasing prestige of science, the growth of government support for university research, and the shift in philanthropy from relief to scientific reform.

Bioc 11

Kohler, Robert E. "Warren Weaver and the Rockefeller Foundation Program in Molecular Biology: A Case Study in the Management of Science," in The Sciences in the American Context: New Perspectives, Nathan Reingold (ed.) Washington, D.C.: Smithsonian Institution Press, 1979.

(funding of research; development of disciplines and specialties)

Study of Rockefeller Foundation support for scientific research, 1929-1939, focusing on the policies of the Natural Sciences Division. Traces the major influence of the program in molecular biology on the development of that discipline, and examines the development of the role of "science manager" at the Foundation.

Bioc 12

Law, John. "The Development of Specialties in Science: The Case of X-ray Protein Crystallography," in Perspectives on the Emergence of Scientific Disciplines, G. Lemaine et al. (eds.) Chicago: Aldine, 1976.

(development of disciplines and specialties; performance of research)

Introduces a distinction between three different types of specialties, on the basis of their mode of solidarity; suggests that the different types of specialties have different patterns of development. Characterizes X-ray crystallography as a "technique-or methods-based" speciality, with a mechanical basis of solidarity (shared instrumentation and methods), and describes the community of scientists interested in protein as members of a "subject-matter specialty", with solidarity resting on concern about a specific subject matter or problem. Examines the relationships of X-ray protein crystallographers with the two scientific communities in which they participated. A third type of specialty, the "theory-based" specialty, is defined in terms of shared concern for theory and its development.

Bioc 13

Long, J. Scott. "Productivity and Academic Position in the Scientific Career," American Sociological Review, 43 (December, 1978), 889-908.

(career patterns; productivity; recognition and reward; graduate education)

Examines the interrelationship between scientific productivity and academic position (based on a longitudinal study of over 200 academic biochemists who received their doctorates in 1957, 1958, 1962 and 1963). Factors considered include publication and citation measures, doctoral training and sponsorship, prestige of initial academic appointment, and institutional changes during career. In contrast to results from other (cross-sectional) studies of scientists, the effect of productivity on the allocation of positions is found to be weak. The effect of departmental prestige on productivity is strong, and increases steadily with time. Includes discussion of the methodological implications of the difference between results from longitudinal and cross-sectional studies.

Bioc 14

Long, J. Scott; Allison, Paul D. and McGinnis, Robert. "Entrance into the Academic Career," American Sociological Review, 44 (October, 1979), 816-31.

(career patterns; productivity; recognition and reward; graduate education)

A sample of 239 (male) Ph.D. biochemists provides the basis for a study of the correspondence between scientific productivity and academic position. The data suggest that the principle determinant of prestige of the first teaching job is the prestige of the most recent departmental affiliation (Ph.D. or postdoctoral), with weaker effects of mentor's prestige and selectivity of undergraduate institution. Early productivity, which is a strong predictor of future productivity, has no measurable effect. The absence of productivity effects on prestige of first appointment run contrary to the expected norm of universalism in science. The career importance of prestige of first position is discussed. (See also Biol 21A)

Bioc 15

McAllister, Paul R.; Anderson, Richard C. and Narin, Francis. "Comparison of Peer and Citation Assessment of the Influence of Scientific Journals," Journal of the American Society for Information Science, (May, 1980), 147-52.

(structure of literature—journal influence; discipline comparisons)

for annotation see Biol 15

Bioc 16

McGinnis, Robert; Allison, P. and Long, J. Scott. "Post Doctoral Appointments in BioScience: Allocations, Payoffs and Returns to Science," unpublished paper. Cornell University: (1979?)

(postgraduate education; productivity; career patterns)

Study of postdoctoral training in biochemistry asks three questions: who gets the appointments? how are their careers affected? how does science benefit? Several characteristics of recipients are identified. Data suggest that post doctoral trainees have improved prospects for faculty appointments, and that their research productivity 8 to 10 years after the Ph.D. is significantly higher than for biochemists who did not have such training. Evidence indicates that although predoctoral research productivity is not a strong influence on receipt of post doctoral appointments, it is a characteristic of those fellows who are most productive later.

Bioc 17

McGinnis, Robert and Long, J. Scott. "The Enduring Effects of Ph.D. Origin: Early Careers of Four Cohorts of Scientists," paper presented at International Symposium on Quantitative Methods in the History of Science, Berkeley, California, August 25-27, 1976.

(graduate education; career patterns; discipline comparisons)

Studies four groups of scientists in order to examine the relationship between education and career. Employment experiences in academic science, government and industry are compared for two cohorts of physicists and two of biochemists (granted Ph.D.s in 1957 and 1962). Characteristics of the Ph.D. institution considered are the level of federal funding of academic science, and whether the institution is public or private. Discussion of the data suggests that Ph.D. characteristics do influence initial employment. The endurance of these patterns, though, is affected by occupational mobility, and differs between cohorts and between fields.

Bioc 18

Menzel, Herbert. "Planned and Unplanned Scientific Communication," in The Sociology of Science, Bernard Barber and Walter Hirsch (eds.) New York: The Free Press of Glencoe, 1962.

(information exchange)

for annotation see Biol 17

Bioc 19

Mullins, Nicholas C. "The Development of a Scientific Specialty: The Phage Group and the Origins of Molecular Biology," Minerva, 10 (January, 1972), 51-82.

(development of disciplines and specialties)

Traces the transition of the Phage Group from shared interest to institutionalization. Examines social processes and intellectual problems for the following stages: paradigm group (1935-1945), communication network (1945-1953), cluster (1954-62) and specialty (1962-1966). Cites conditions of luck, leadership, identification of a substantial problem, and institutional stability as factors in development. Contrasts development of molecular biology and development of psychology.

Bioc 20

Narin, F.; Carpenter, M. P. and Berlt, N. C. "Inter-relationships of Scientific Journals," Journal of the American Society for Information Science, 23 (no. 5, 1972), 323-31.

(structure of literature; discipline comparisons)

for annotation see Biol 22

Bioc 21

Price, Derek J. de Solla and Beaver, Donald de B. "Collaboration in an Invisible College," American Psychologist, (no. 21, 1966), 1011-18.

(information exchange; performance of research)

Analyzes communication and collaboration patterns in an information exchange group organized by the National Institutes of Health (Information Exchange Group #1, Oxidative Phosphorylation and Terminal Electron Transport). In less than five years (1961-65) the group grew from 32 to 592 members, who participated in a continuing "congress by mail." A study of over 500 memos identifies "core" and "floating" populations within the group. The authors suggest that the "research front is dominated by a small core of active workers and a large and weak transient population of their collaborators . . . (there is a) possibility that it is by working together in collaboration that the greater part of research front communication occurs.

Bioc 22

Rubenstein, Albert H. et. al. "Exploration on the Information-Seeking Style of Researchers," in Communication Among Scientists and Engineers, Carnot E. Nelson and Donald J. Pollock (eds.) Lexington, Massachusetts: D. C. Heath and Company, 1970.

(information exchange; discipline comparisons)

Develops the concept of an individual and a group "information style." Studies of X-ray crystallographers in industrial and non-industrial laboratories, and of medical researchers, identify patterns of information seeking and use. The flexibility of the style is tested by introducting new information services. The 18 crystallographers studied did not make "permanent, observable changes" in observed patterns after three years of access to a new (free) information system (long distance phone calls to national information centers; search, reprint and bibliography services). Similar experiments in medical research settings show some scientists making use of new free services, but few willing to pay for permanent services. Plans for further studies are outlined.

Bioc 23

Small, Henry G. "A Co-Citation Model of a Scientific Specialty: A Longitudinal Study of Collagen Research," Social Studies of Science, 7 (May, 1977), 139-66.

(structure of literature--specialty groups)

Outlines a method for the study of change within specialties, and applies the method to collagen research. Highly cited papers are identified, and assumed to be markers of important concepts and methods. Analysis of the number of times each paper has been cited together with another (co-citation) establishes clusters of highly interacting documents; the succession of clusters over time identifies shifts in research focus. The pattern of events suggested by the study of collagen literature is: "stability (1970-1971); discovery represented by a sub-cluster of recent papers attached to the old cluster (1972); a shift in research focus with the disappearance of the older cluster (1973); and rapid growth of the new cluster with a division into subspecialties (1974)." A survey of collagen researchers, asking them to identify key papers and conceptual shifts, shows that their perceptions of the sequence of events parallels the sequence determined through co-citation analysis. The communication networks suggested by the clusters are also confirmed by interviews with collagen specialists. The specialty is characterized by a few major centers of research, a small number of researchers, and a high level of informal communication.

Bioc 24

Watson, James D. The Double Helix. New York: Atheneum, 1968.

(discovery process; competition)

Personal account of the discovery of the structure of DNA illustrates the influence of personality and cultural tradition in scientific research, and provides a view of competition in science as fueled by "the contradictory pulls of ambition and fair play."

Bioc 25

Woolf, Patricia. "The Second Messenger: Informal Communication in Cyclic AMP Research," Minerva, 13 (Autumn, 1975), 349-73.

(information exchange; development of disciplines and specialties)

Examines "the crucial importance of informal communication in the growth of a field of biochemical research" (cyclic AMP research.) The degree of informal communication is especially high in rapidly expanding fields. It supplements slower, more formal modes, and is only loosely controlled by their norms. (Informal communication includes a range of exchange, from casual conversation, seminars and meetings to exchange of biological material, suggestions on procedures, and the circulation of unpublished material.) The article discusses the role of the Gordon Conferences in increasing group coherence and improving communication.

BIOMEDICINE

Biom 1

Barber, Bernard. "The Ethics of Experimentation with Human Subjects," *Scientific American*, 234 (February, 1976), 25-31.

(attitudes and values; competition)

Examines the attitudes and practices of biomedical investigators who do research with human subjects. A mail survey of 300 biomedical research institutions and an intensive interview study of 350 investigators at two institutions provide data on the issues of benefits and risks, and informed consent. On both issues, clear patterns emerge: the majority of investigators are "strict," but a significant minority are "permissive." "Less than ethical" treatment is traced to shortcomings in the training of physicians and in the screening and monitoring of research by review committees, and to a tension between investigation and therapy. Discusses "indications that the struggle for scientific priority and recognition exerts pressure on ethical considerations."

Biom 2

Brieger, Ronald L. "Career Attributes and Network Structure: A Blockmodel Study of a Biomedical Research Specialty," *American Sociological Review*. 41 (February, 1976).

(information exchange; social stratification)

Blockmodel analysis is presented as a method for interpreting the structure of social relationships in science. A specialty in biomedical research (neural control of food and water intake) forms the basis of the study. Construction of multiple networks, based on individual reports of contact or unawareness, provides a "blockmodel" of interaction among 107 scientists. Position in the multiple network structures is compared with career characteristics. Block memberships, "which cohere in a relational structure, are also seen to cohere by the similarity of their attributes."

Biom 3

Carter, G. M. "Peer Review, Citations and Biomedical Research Policy: NIH Grants to Medical School Faculty," Rand Report R-1583-HEW. Santa Monica, California: Rand Corporation, December, 1974.

(funding of research; productivity)

Evaluates peer review processes at NIH. Priority scores assigned to research proposals at the time of application are correlated with priority scores assigned at renewal, and with an "objective measure"--the production of at least one highly cited article. The effects of other variables (funding mechanisms, size and length of grant, differences between awarded and requested amounts) are used to estimate the probability that a grant will produce a highly cited article. A finer output measure--total number of citations per grant--includes consideration of time-related citation patterns, size of scientific fields, number of years support. Additional issues discussed are: effect of shift in funding levels among NIH institutes, effect of program division by specific disease rather than by biomedical specialty, possible effects of bias in peer review groups, and the general issues of target vs. basic research and NIH's relation with medical schools. (This annotation is drawn from Citation Analysis: An Annotated Bibliography, S. Cozzens, et. al. Philadelphia: Institute for Scientific Information, May, 1978.)

Biom 4

Chubin, D. E. and Studer, K. E. "Knowledge and Structures of Scientific Growth: Measurement of a Cancer Problem Domain," Scientometrics, 1 (no. 2, 1979), 171-93.

(structure of literature--specialty groups)

"(A) cancer 'problem domain' is examined (1) to distinguish a growth in knowledge from a proliferating research literature, and (2) show how measurement of formal communication, uninformed by the 'historical record,' clarifies or distorts sociological interpretations of innovation and growth in biomedicine. Specifically, coauthorship and citation networks are analyzed for reverse transcriptase researchers, 1970-74. This analysis reveals the visibility of large National Cancer Institute laboratories in the research literature, but demonstrates the need to augment disaggregated network data with intellectual and social (policy) history to explain the growth and structure of the domain." (Authors' abstract.)

Biom 5

Comroe, Julius H., Jr. and Dripps, Robert D. "Scientific Basis for the Support of Biomedical Science," Science, 192 (April 9, 1976), 105-11.

(funding of research; discovery process)

Authors argue that national biomedical science policy should not be based solely on mission-oriented research. Extensive study of advances in the treatment of cardiovascular and pulmonary diseases shows that 41% of the articles reporting work later judged to be essential for clinical advance had no original clinical orientation. More research needs to be done on the nature of discovery in order to develop better policy guidelines.

Biom 6

Fox, Renee C. "Medical Sciences in a Chateau," Science, 136 (May 11, 1962), 476-83.

(competition; career patterns; discipline organization; national comparisons)

Examines the effect of social, cultural and historical factors on medical research and biomedical research careers in Belgium. Competition (among ethnic, linguistic, religious, class, community, special interest and political groups) for material resources, status, and authority is reflected in the university structure, where most clinical research is done. Among the characteristics of the discipline noted by the author are: duplication without cooperation; infrequent interchange of information and ideas; lack of funds, equipment, and modern facilities; low salaries; provisional position of researchers (employment of members of a group may be tied to the official position of one leader).

Biom 7

Frame, J. Davidson; Narin Francis and Carpenter, Mark P. "The Distribution of World Science," Social Studies of Science, 7 (November, 1977), 501-16.

(structure of literature; national comparisons; discipline comparisons)

for annotation see Biol 5

Biom 8

Garfield, Eugene; Malin, Morton V. and Small, Henry. "Citation Data as Science Indicators" in Toward A Metric of Science, Y. Elkana et al. (eds.) New York: John Wiley and Sons, 1978.

(structure of literature--specialty groups; discipline comparisons)

Section on Social and Cognitive Structure of Science discusses experiments using co-citation analysis to derive clusters of inter-related literature. Suggests that these document networks reflect both the cognitive structure and the social structure of specialties, and that "the specialty appears to be a natural unit of structure and organization of science." Maps of clusters of co-citations can demonstrate current links between disciplines; shifts in clusters over time may be used to investigate the nature of change in specialties. Includes examples from particle physics and biomedicine.

Biom 9

Glaser, Barney G. Organizational Scientists: Their Professional Careers. New York: Bobbs-Merrill, Inc., 1964.

(recognition and reward; career patterns)

Study of biomedical scientists working in basic research at a medical research organization examines several aspects of their careers. Focuses in particular on the effect of professional recognition and reputation on careers in scientific organizations.

Biom 10

Goffman, William. "Mathematical Approach to the Spread of Scientific Ideas--The History of Mast Cell Research," Nature 2121 (October 29, 1966), 449-52.

(development of disciplines and specialties)

Applies the "mathematical theory of epidemics to the investigation of the spread of scientific ideas." The entire population of mast cell researchers (2,195) provides the basis for a study of the quantitative growth of researchers and publications in a specialty. The author finds that the transmission of ideas parallels the epidemic model for transmission of infection. He suggests that "this mathematical method can be used to establish the relative importance of existing lines of inquiry to the development of a given scientific topic, predict their future behavior and predict the emergence of new important lines of investigation."

Biom 11

Gray, Bradford H.; Cooke, Robert A. and Tannenbaum, Arnold S. "Research Involving Human Subjects," *Science*, 201 (September 22, 1978), 1094-1101.

(discipline organization; attitudes and values; discipline comparisons)

Examines the functions of institutional review boards, designed to evaluate proposals for research involving human subjects. The composition of boards, their policies, procedures and effect on research are discussed. The attitudes of investigators and review board members toward the review process are compared for biomedical sciences and behavioral and social sciences.

Biom 12

Inhaber, H. and Przednowek, K. "Quality of Research and the Nobel Prizes," *Social Studies of Science*, 6 (1976), 33-50.

(recognition and reward; structure of literature--citation rates; discipline comparisons)

"Citation rates 10 years before and after receiving Nobel Prizes are tabulated for 53 winners in 3 fields (medicine, physics, chemistry) and are compared to rates before and after election to the National Academy of Sciences for 340 members, and to the entire group of scientists cited in the SCI (several hundred thousand). Post Nobel Prize rates increase, except for medicine, where they decrease. The inverse is true of NAS elections. Adjustment is made for Nobel Prizes shared among several scientists, but this does not substantially change the rates. SCI (Science Citation index) citation rates, with arbitrary "prize points", remain constant. . . . The data are explained by the publicity of the award or a halo effect and do not agree with the more limited sample of physics Nobelists, (Cole and Cole 1973; see Phys 19). Some problems of the SCI, especially with respect to multiple authored papers are discussed, and may be significant for the Nobel Prize group." (From *Citation Analysis: An Annotated Bibliography*, S. Cozzens, et. al. Philadelphia: Institute for Scientific Information, May, 1978.)

Biom 13

Latour, Bruno and Woolgar, Steve. *Laboratory Life: The Social Construction of Scientific Facts*. Beverly Hills, London: Sage Publications, 1979.

(discovery process; recognition and reward)

Examines laboratory life at the Salk Institute through the eyes of an observer who worked in the laboratory for nearly two years. The specific interests of the authors are "the way in which the daily activities of working scientists lead to the construction of facts" and "the differences (if any) between the construction of facts and the construction of accounts." Includes a case study of the isolation and characterization of TRF(H), based on interviews and archives of two new endocrinology research groups. The reward and credibility structure of science are discussed. The authors also analyze their own "anthropological" approach in terms of fact construction.

Biom 14

Narin, Francis and Keith, Stephen B. "The Intramural Role of the NIH as a Biomedical Resarch Institute," Federation Proceedings, 37 (June, 1978), 2120-23.

(discipline organization; productivity)

Examines role of investigators at NIH in biomedical research. Publications of NIH scientists are analyzed to determine size of output, clinical-basic distribution, appearance in influential journals, and subject areas emphasized. Results show that NIH scientists account for over 3% of all U. S. biomedical papers (more than any other group). The publications appear in influential journals, and show a strong emphasis on clinical laboratory investigation--especially in the area of cancer research. This emphasis places NIH in a middle position between the more clinical orientation of medical schools and the basic research focus of graduate departments.

Biom 15

Narin, Francis; Pinski, Gabriel and Gee, Helen Hoffer. "Structure of Biomedical Literature," Journal of the American Society for Information Science, 27 (January-February, 1976), 25-45.

(structure of literature--journal influence)

Study of 900 biomedical journals reveals a hierarchy of influence (as measured by citation analyses): basic research journals and fields have greater "influence measures" than clinical journals and fields. The most influential areas in biomedical research seem to be physiology and biochemistry. Authors point out that studies such as these clarify patterns of research activity, and provide information to be considered in the allocation of funds and in the assessment of the effect of funding.

Biom 16

Orr, Richard; Abdian, Gregory and Leeds, Alice A. "Generation of Information: Published Output of U. S. Biomedical Research," Federation Proceedings, 23 (November-December, 1964), 1297-1309.

(productivity; funding of research)

Statistics on the magnitude of the biomedical research effort (funds, manpower, organization) are compared with data on published output. Over the past decade, document output has increased at about the same rate as research manpower, and approximately half as rapidly as total research expenditures. There is a steady, general trend toward multiple authorship.

Biom 17

Rubenstein, Albert H. et. al. "Exploration on the Information-Seeking Style of Researchers," in Communication Among Scientists and Engineers, Carnot E. Nelson and Donald J. Pollock (eds.) Lexington, Massachusetts: D. C. Heath and Company, 1970.

(information exchange; discipline comparisons)

for annotation see Bioc 22

Biom 18

Small, Henry and Griffith, Belver C. "The Structure of Scientific Literatures I. Identifying and Graphing Specialties," Science Studies, 4 (November, 1974), 17-40.

(structure of literature--specialty groups; discipline comparisons)

Reports on technique for identifying clusters of highly interactive documents in science (co-citation analysis). This technique opens the way to a systematic exploration of the specialty structure of science, including both the internal structure of specialties and their relationship to one another. Examines in some detail clusters in nuclear physics, particles physics and biomedicine. Finds structure of biomedical literature different from that of physics literature.

Biom 19

Sullivan, Daniel. "Competition in Bio-Medical Science: Extent, Structure and Consequences," Sociology of Education, 48 (Spring, 1975), 223-41.

(competition; social stratification)

Interviews with 387 biomedical scientists at two biomedical research institutions, conducted as part of a study of ethical standards and practices in biomedical research on humans (see Barber, Biom 1), provide information for a study of competition in biomedical science. Data suggest that the degree of competition that a scientist feels in his work varies with his age and status: high quality researchers (measured by publication output and citations received) and older researchers are more likely to report having been anticipitated in the publicatiton of their work. Young, highly productive scientists and older, low ranking scientists are most concerned about anticipation. The effect of competition on communication, and the increase in secrecy due to competition are discussed.

Biom 20

Worboys, Michael. "The Emergence of Tropical Medicine," in Perspectives on the Emergence of Scientific Disciplines, G. Lemaine et al. (eds.) Chicago: Aldine, 1976.

(development of disciplines and specialties)

Examines social and intellectual factors that influenced the emergence of tropical medicine as a recognized field of research, teaching and professional practice in the British Empire. Discusses the intellectual background provided by 19th Century biology and traces the effects of the demand for increases in the quantity and quality of colonial medical officers, a demand linked to the political and economic imperialism of the period.

CHEMISTRY

Chem 1

Allison, Paul D. and Stewart, John A. "Productivity Differences Among Scientists: Evidence for Accumulative Advantage," American Sociological Review, 39 (August, 1974), 596-606.

(productivity--age; discipline comparisons)

for annotation see Biol 1

Chem 2

Amick, Daniel J. "An Index of Scientific Elitism and the Scientific Mission," Science Studies 4 (January, 1974), 1-16.

(career patterns; social stratification)

A study of 194 chemists in the Greater Pittsburgh area (40% academic, 39% industrial, 14% government, 7% non-profit research). Ten variables dealing with professional involvement and productivity are combined into a single index of "scientific elitism" (social and intellectual status). Most chemists judged "elite" work in basic research areas of a basic-applied continuum, and their work settings are academic rather than industrial or governmental.

Chem 3

Anderson, Richard C., Narin, Francis and McAllister, Paul. "Publication Ratings versus Peer Ratings of Universities," Journal of the American Society for Information Science, 29 (March, 1978), 91-103.

(university ratings; discipline comparisons)

for annotation see Biol 2

Chem 4

Beranek, William, Jr. (ed.) Science, Scientists and Society. New York: Bogden and Quigly, Inc., 1972.

(attitudes and values)

Collection of nine lectures and audience discussions on "Chemistry and Society" presented at the California Institute of Technology, Winter, 1971. Scientists speak about the intellectual state of chemistry, the moral dilemmas of chemists, the effects of chemistry on society, responsibilities of scientists, motivations of scientists, and the future of chemistry.

Chem 5

Beyer, Janice M. "Editorial Policies and Practices Among Leading Journals in Four Scientific Fields," Sociological Quarterly, 19 (Winter, 1978), 66-88.

(paradigm characteristics; publication practices; discipline comparisons)

"The editorial policies and practices of leading journals in four scientific field (chemistry, physics, political science and sociology) are compared to determine differences related to stages of paradigm development. Hypotheses are developed and tested on the use of particularism, the ease of reaching editorial decisions, the length of articles, extent of copy-editing, and time lags in the publication process. Data were obtained via a mail survey of the editors of the top ten journals in physics, chemistry, sociology, and political science, as nominated by university scientists. Results are generally supportive of the hypotheses. Data on available space, financial support, and rejection rates are also discussed as reinforcing tendencies toward particularism and increasing its costs." (Abstract from article.)

Chem 6

Beyer, Janice M. and Lodahl, Thomas M. "A Comparative Study of Patterns of Influence in United States and English Universities," Administrative Science Quarterly, 21 March, 1976), 104-29.

(discipline organization; paradigm characteristics; discipline comparisons; national comparisons)

Examines influences on decision-making in US and British universities. Data are drawn from 20 departments each in physics, chemistry, sociology and political science (US) and from 12 interdisciplinary schools (Britain). Analyzes distribution of influence among individual faculty, faculty members in groups, subunit heads, and members of the central administration; discipline variations are examined. Patterns of influence are compared for the two countries.

Chem 7

Beyer, Janice M. and Snipper, Reuben. "Objective Versus Subjective Indicators of Quality in Graduate Education," Sociology of Education, 47 (1974), 541-57.

(university ratings; paradigm characteristics; discipline comparisons)

Examines relationship of the rated quality of university departments to other possible quality indicators. Comparison of departments in physics, chemistry, sociology and political science suggests that the structure of knowledge within a scientific discipline has implications for attempted measurements of quality. In different fields, different objective indicators are important correlates of subjective ratings, with the differences related to degree of paradigm development. Article includes a survey of other studies attempting to establish similar indicators.

Chem 8

Beyer, Janice M. and Stevens, John M. "Differences Between Scientific Fields in Patterns of Research Activity and Productivity," paper no. 195, State University of New York at Buffalo, School of Management, October, 1974.

(performance of research; paradigm characteristics; discipline comparisons)

Analyzes data on academic chemistry, physics, political science and sociology in order to compare research activity to the level of paradigm development within each field (data comes from 20 departments in each of the four disciplines). Among the factors considered are: collaboration and communication, research resources, types of publication, and areas of disagreement. The differences revealed about these activities, and the results of earlier studies of these four disciplines that relate paradigm differences to differences in teaching, funding and decision making, suggest the persistent effect of cognitive structure on a wide range of scientific activities. Differences are most marked between high-paradigm fields (chemistry and physics) and low-paradigm fields (political science and sociology).

Chem 9

Beyer, Janice M. and Stevens, John M. "Factors Associated With Changes in Prestige of University Departments," Research in Higher Education, 7 (1977), 229-55.

(university ratings; discipline comparisons)

Examines possible predictors of changes in prestige of university departments. The data are from a survey of 20 departments each in chemistry, physics, political science and sociology. Four models of predictors are advanced and tested, (1) related to resources available, (2) related to research performance (3) related to the reputation of individual department members, (4) related to organizational structure of the department. Results show large differences across the four fields examined, "suggesting that there is no single set of factors that can reliably predict improvement or decline in prestige across all disciplines."

Chem 10

Blume, Stuart S. and Sinclair, Ruth. "Aspects of the Structure of a Scientific Discipline," in Social Processes of Scientific Development, Richard Whitley (ed.) London and Boston: Routledge, Keegan & Paul, Ltd., 1978.

(performance of research; competition; productivity)

Examination of the social structure of chemistry in the United Kingdom based on a postal survey of British university chemistry departments. Respondents are self-classified by eight sub-disciplines, providing a distribution of research interests. Systematic differences in the social structure of the subdisciplines are identified, including differences in work organization (size of research groups, types of instrumentation), publication practices, and intensity of competition.

Chem 11

Blume, S. S. and Sinclair, Ruth. "Chemists in British Universities: A Study of the Reward System in Science," American Sociological Review, 38 (February, 1973), 126-38.

(recognition and reward)

Study of the scientific output of British university chemists. Recognition received (medals, appointment to advisory committees, etc.) is highly related to quality of output, and least related to industrial orientation in work. It appears that a majority of university chemists are oriented toward the basic research community for their contributions and rewards, rather than toward the industrial community.

(Michael Malec comments on this study, in "Comments," American Sociological Review, 39 (February, 1974), 146-7. Suggests that use of different statistical tools would show that industrial involvement of university chemists is source of internal rewards. Blume and Sinclair defend their conclusions, pp. 147-8).

Chem 12

Breneman, David W. "Effects of Recent Trends in Graduate Education in University Research Capability in Physics, Chemistry and Mathematics," in The State of Academic Science: Background Papers, Bruce L. R. Smith and Joseph J. Karlesky (eds.) New York: Change Magazine Press, 1978.

(graduate education; funding of research; discipline comparisons)

Comparative study of academic chemistry, mathematics and physics focuses on changes occurring in graduate education: trends in number and quality of graduate enrollments; type and source of student support; Ph.D.'s awarded; length of time to completion of degree; role of postdoctoral fellows; age composition of faculty. Includes statistical data on each field (1968-75) and information from interviews with faculty. Examines the role of graduate students in teaching and research, and finds significant differences between the three disciplines. Discusses the different effects of declining enrollments and reduced federal support for graduate students on different ranks of departments within each discipline. The lack of academic openings for new Ph.D.'s may cause a shift in funding from education of graduates to employment of young faculty.

Chem 13

Bud, Robert F., et. al. "Indicators of Power and Structure: The American Chemical Society as Case Example," paper presented at the Fourth Annual Meeting of the Society for Social Studies of Science. Washington, D.C. November, 1979 (from study to be published by D. Reidel in 1981).

(development of disciplines and specialties; professional associations; social stratification)

Studies the growth of chemistry as an occupation, profession and discipline, and examines changes in the social structure of the community. Includes discussion of:

differentiation and specialization in the academic discipline; the growth in size and influence of the American Chemical Society; proliferation of ACS journals; patterns of ACS leadership. The authors conclude that "(s)ince World War I, an elite gerontocracy has presided over the Society. Routes of entry to leadership have been extremely limited, and academic chemists have exerted disproportionate control. Intricate networks of social ties have linked members of this elite." (Authors' abstract.)

Chem 14

Carpenter, M. P. and Narin, F. "Clustering of Scientific Journals," Journal of the American Society for Information Science, 24 (no. 6, 1973), 425-36.

(structure of literature--specialty groups; discipline comparisons)

for annotation see Bioc 3

Chem 15

Cole, Stephen. "Age and Scientific Performance," American Journal of Sociology, 84 (January, 1979), 958-77.

(productivity--age; paradigm characteristics; discipline comparisons)

Analysis of data from academic scientists in six fields (mathematics, physics, chemistry, geology, sociology, psychology) disputes belief that age is negatively associated with scientific productivity and creativity. Slight fluctuations in output at different age levels are explained by the operation of the scientific reward system (assumption of offices, administrative and referee duties, etc.). Data also suggests that the degree of codification or development of a science does not effect the rate of important discoveries made by scientists. Concludes that an increase in the mean age of scientists is unlikely in itself to cause a decline in our scientific capacity.

Chem 16

Cole, Stephen. "Scientific Reward Systems: A Comparative Analysis," in Research in Sociology of Knowledge, Sciences and Art. Robert A. Jones (ed.) Greenwich, Connecticut: JAI Press, Inc. 1978.

(recognition and reward; paradigm characteristics; discipline comparisons)

for annotation see Bioc 4

Chem 17

Cole, Stephen; Cole, Jonathan and Dietrich, Lorraine. "Measuring the Cognitive State of Scientific Disciplines," in Toward a Metric of Science, Y. Elkana, et al. (eds.) New York: John Wiley and Sons, 1978.

(paradigm characteristics; discipline comparisons) for annotation see Bioc 5

Chem 18

Cole, Stephen; Rubin, Leonard and Cole, Jonathan R. Peer Review in the National Science Foundation: Phase One of a Study. Washington, D.C.: National Academy of Sciences, 1978.

(funding of research; discipline comparisons)

for annotation see Bioc 6

Chem 19

Dolby, R. G. A. "The Case of Physical Chemistry," in Perspectives on the Emergence of Scientific Disciplines, G. Lemaine et al. (eds.) Chicago: Aldine, 1976.

(development of disciplines and specialties; national comparisons)

Traces the development of physical chemistry, in order to examine the relative role of social and cognitive factors in the emergence of a new discipline. Compares national differences (Germany, France, Britain, America) in institutions and in internal developments in chemistry, and examines how the differences affect the development of physical chemistry at four stages: (1) the appearance of new ideas and techniques at the periphery of the established field; (2) the formation of localized groups that explore and expand the idea, and train students; (3) the diffusion of the group, with their distinctive interests and skills maintained; (4) the achievement of institutional status as a separate discipline.

Chem 20

Edge, David O. and Mulkay, Michael J. Astronomy Transformed. New York: John Wiley and Sons, 1976.

(development of disciplines and specialties; discipline comparisons)

for annotation see Astr 2

Chem 21

Frame, J. Davidson; Narin, Francis and Carpenter, Mark P. "The Distribution of World Science," Social Studies of Science, 7 (November, 1977), 501-16.

(structure of literature; national comparisons; discipline comparisons)

for annotation see Biol 5

Chem 22

Friedlander, Frank. "Performance and Orientation Structure of Research Scientists," Organizational Behavior and Human Performance, 6 (March, 1971), 169-83.

(performance of research; discipline comparisons)

for annotation see Biol 6

Chem 23

Gaston, Jerry. The Reward System in British and American Science. New York: John Wiley and Sons, 1978.

(recognition and reward; paradigm characteristics; discipline comparisons; national comparisons)

for annotation see Biol 7

Chem 24

Grefrath, R. W. "A Study of Citations of 308 Journal Articles in Chemistry Published in 1963," Journal of Chemical Documentation, 14 (no. 2, 1974), 95-98.

(structure of literature)

"308 articles published in 1963 from 7 journals are classified as theoretical or practical, and college or industry authored. Citations to them are tabulated for the years 1964-1971 (both cumulative and average scores). The data show the predominate influence on the citation lifetime on an article is its authorship, and not whether it is practical or theoretical. Practical college articles had the highest lifetime; theoretical industrial the lowest." (From Citation Analysis: An Annotated Bibliography, S. Cozzens, et al. Philadelphia: Institute for Scientific Information, May, 1978.)

Chem 25

Hagstrom, Warren O. "Competition in Science," American Sociological Review, 39 (February, 1974), 1-18.

(competition; discipline comparisons)

for annotation see Biol 8

Chem 26

Hagstrom, Warren O. "Factors Related to the Use of Different Modes of Publishing Research in Four Scientific Fields," in Communication Among Scientists and Engineers, Carnot E. Nelson and Donald K. Pollock (eds.) Lexington, Massachusetts: D. C. Heath and Company, 1970.

(information exchange; discipline comparisons)

for annotation see Biol 9

Chem 27

Hagstrom, Warren O. "Forms of Scientific Teamwork," Administrative Science Quarterly, 9 (December, 1964), 241-63.

(performance of research; discipline comparisons)

for annotation see Biol 10

Chem 28

Hagstrom, Warren O. "Inputs, Outputs, and the Prestige of American University Science Departments," Sociology of Education, 44 (Fall, 1971), 375-97.

(university ratings; discipline comparisons)

for annotation see Biol 11

Chem 29

Hagstrom, Warren O. "The Production of Culture in Science," American Behavioral Science, 19 (July/August, 1976), 753-68.

(performance of research; paradigm characteristics; discipline comparisons)

for annotation see Biol 12

Chem 30

Hagstrom, Warren O. The Scientific Community. New York: Basic Books, 1965.

(recognition and reward; competition; performance of research; discipline comparisons)

for annotation see Biol 13

Chem 31

Hargens, Lowell L. Patterns of Scientific Research: A Comparative Analysis of Research in Three Scientific Fields. Washington, D.C.: The Arnold and Caroline Rose Monograph Series in Sociology, American Sociological Association, 1975.

(performance of research; paradigm characteristics; discipline comparisons)

Studies the differences in patterns of scientific research in the disciplines of chemistry, mathematics and political science, and examines links between the social organization of each field and the personal work experiences of academic scientists. The topics explored are: (1) the social integration of scientific disciplines (the degree to which members concur on norms, values and beliefs central to the discipline, the degree to which specialized contributions are complementary); (2) the differences between disciplines in the degree of "routine" in research (planning and efficiency of work, division of labor in research, segregation of work from other spheres of life); (3) the effect of new techniques and complex technologies on the pattern and pace of research.

Chem 32

Hargens, Lowell L. "Relations Between Work Habits, Research Technologies, and Eminence in Science," Sociology of Work and Occupations, 5 (February, 1978), 97-112.

(performance of research; productivity; recognition and reward; discipline comparisons)

Study of 549 faculty members in chemistry, mathematics and political science "examines relations between the work habits of academic scientists and measures of scholarly eminence and productivity." The data on individual scientists include measures of time invested in research, publication and citation rates, and receipt of honors and awards. Analysis of the data suggests that variations in the relations between work habits and scholarly output are linked to differences in the level of predictability or routine in research work. Includes discussion of predictibility and routine in research as a function of social integration of a scientific community.

Chem 33

Hargens, Lowell L.; McCann, James C. and Reskin, Barbara. "Productivity and Reproductivity: Fertility and Professional Achievement among Research Scientists," Social Forces, 57 (September, 1978), 154-63.

(productivity)

Examines publication and citation data on a group of Ph.D. research chemists (57 married women, 29 married men) to "test the hypothesis that marital fertility is associated with lower levels of research productivity and to assess the extent to which the fertility-productivity relationship varies by sex." A negative relationship is found between fertility and productivity; the relationship is similar for both sexes. The effect of this relationship would be strongest in settings which encourage the performance and publication of research.

Chem 34

Inhaber, H. and Przednowek, K. "Quality of Research and the Nobel Prizes," Social Studies of Science, 6 (1976), 33-50.

(recognition and reward; structure of literature--citation rates; discipline comparisons)

for annotation see Biom 12

Chem 35

Krohn, Wolfgang and Schafer, Wolf. "The Origins and Structure of Agricultural Chemistry," in Perspectives on the Emergence of Scientific Disciplines, G. Lemaine et al. (eds.) Chicago: Aldine, 1976.

(development of disciplines and specialties)

Examines the development and institutionalization of scientific specialties through a case study of agricultural chemistry. Explores the influence of social needs on the emergence and formation of fundamental theories, and suggests that agricultural chemistry is one of the earliest examples of successful goal-oriented theory development.

Chem 36

Kruytbosch, Carlos with Papenfuss, Susan. "Some Social and Organizational Characteristics of Breakthrough Science: An Analysis of Major Innovations in Four Fields of Science, 1950-1976," paper presented at the IX World Congress of Sociology, Uppsala, Sweden, August 17, 1978.

(discovery process; funding of research; discipline comparisons)

for annotation see Astr 6

Chem 37

Langrish, J. "The Changing Relationship Between Science and Technology," Nature, 250 (August, 1974), 614-16.

(information exchange)

"The author examines the premise that techological innovation stems from scientific research and suggests that relative to the early decades of the twentieth century, the relationship between science and techology has changed drastically. To test this premise, abstracts in five volumes of the Journal of the Society of Chemical Industry between 1884 and 1952 were classified by institutional locus, the main geographic divisions being Britain, the United States, and Europe. A marked decline in university-based contributions is parallelled by a concomitant increase in industrial-based research over time. When citations from 1957, 1961, and 1967 Industrial Reviews are examined by institutional locus, again a notable decrease in the relative contribution of the university to industrial chemistry emerges." (From Citation Analysis: An Annotated Bibliography, S. Cozzens, et al. Philadelphia: Institute for Scientific Information, May, 1978)

Chem 38

Lodahl, Janice Beyer and Gordon, Gerald. "Differences Between Physical and Social Sciences in University Graduate Departments," Research in Higher Education, 1 (1973), 191-213.

(paradigm characteristics; discipline organization; discipline comparisons)

Compares data on decision making in 80 university departments (20 each in chemistry, physics, political science and sociology), and relates differences found between the disciplines to different degrees of paradigm development. Greater paradigm development in the physical sciences enhances departmental autonomy, and facilitates a committee structure for decisions related to teaching processes. Lower paradigm development in the social sciences reduces departmental autonomy, but contributes to greater autonomy for individual department members and to a pattern of individual-chairman negotiations on teaching. In all four fields, departments with high reputations show collegial structure, while those with lower reputations tend toward bureaucratic structure.

Chem 39

Lodahl, Janice Beyer and Gordon, Gerald. "Funding the Sciences in University Departments," Educational Record, 54 (no. 1, 1973), 74-82.

(funding of research; paradigm characteristics; discipline comparisons)

"Analysis of differential funding of four scientific fields within universities and the relationship of funding to quality." Funding data are from a survey of 20 departments each in chemistry, physics, political science and sociology; quality ratings are from Allan Cartter, American Council on Education, 1966. The data show higher levels of funding in the physical sciences and suggest that quality of department "is not associated as strongly with levels of funding in the social as in the physical science." The authors suggest that the well developed physical sciences have an advantage over less developed fields, because results in physical sciences are more visible and more easily evaluated.

Chem 40

Lodahl, Janice Beyer and Gordon, Gerald. "The Structure of Scientific Fields and the Functioning of University Graduate Departments," American Sociological Review, 32 (February, 1972), 57-72.

(paradigm characteristics; graduate education; performance of research; discipline comparisons)

Tests hypothesis that high paradigm development in a discipline would facilitate research and training (through improved communication processes and access to information). Data collected from 80 university graduate departments (20 each in chemistry, physics, sociology and political science) illustrate differences between the fields: physicists and chemists show more agreement over field content, and greater willingness to spend time with graduate students; chemists collaborate with more graduate students in research than scientists in the other fields. Additional factors compared are the level of innovation pursued within a field, and the degree of differentiation of the field into subdisciplines.

Chem 41

McAllister, Paul R.; Anderson, Richard C. and Narin, Francis. "Comparison of Peer and Citation Assessment of the Influence of Scientific Journals," Journal of the American Society for Information Science, (May, 1980), 147-52.

(structure of literature--journal influence; discipline comparisons)

for annotation see Biol 15

Chem 42

Narin, Francis. Evaluative Bibliometrics: The Use of Citation Analysis in the Evaluation of Scientific Activity. New Jersey: Computer Horizons, Inc., 1976.

(structure of literature--journal influence; discipline comparisons)

for annotation see Biol 21

Chem 43

Narin, F; Carpenter, M. P. and Berlt, N. C. "Inter-relationships of Scientific Journals," Journals of the American Society for Information Science, 23 (no. 5, 1972), 323-31.

(structure of literature; discipline comparisons)

for annotation see Biol 22

Chem 44

Neumann, Yoram. "Predicting Faculty Success in University Graduate Departments," Research in Higher Education, 6 (1977), 275-87.

(recognition and reward; paradigm characteristics; discipline comparisons)

Examines field differences in factors contributing to faculty success. Data are drawn from a survey of 20 departments each in chemistry, physics, political science and sociology (Lodahl and Gordon, Chem 40). Success is measured as a composite of salary and departmental reputation. Factors tested for their relevance to success are: professional age, research articles published, and books published. Analysis of the data suggests that, for tenured faculty, professional age and publication of books are more important predictors of success in "low technology" fields (political science, sociology); publication of research articles is a better predictor of success in "high technology" fields (chemistry, physics). The success-performance-seniority model is not a good predictor for non-tenured faculty, who may be subject to different assessment criteria.

Chem 45

Neumann, Yoram. "Predictors of Funding in Academic Fields," Research in Higher Education, 9 (1978), 115-22.

(funding of research; paradigm characteristics; discipline comparisons)

Examines possible predictors of funding in four disciplines (chemistry, physics, political science, sociology). Data are drawn from a survey of 20 departments in each of the four disciplines (Lodahl and Gordon, Chem 40). Different forms of research publication and different criteria for evaluation in the disciplines are discussed in terms of levels of paradigm or "technological" development. Analysis of the data on individual researchers suggests that past research articles published are an accurate predictor of funding in chemistry. Books are not accurate predictors in the social or the physical sciences. The author discusses the implications that field differences have for funding policies.

Chem 46

Neumann, Yoram and Boris, Steven Barnet. "Paradigm Development and Leadership Style of University Department Chairpersons," Research in Higher Education, 9 (1978), 291-302.

(paradigm characteristics; discipline organization)

Examines leadership styles of university department chairpersons in four disciplines (chemistry, physics, political science, sociology). Data are drawn from a survey of 20 departments in each discipline (Lodahl and Gordon, Chem 40). The author suggest that "the paradigm state of a scientific field corresponds with the technology employed by the field and the stability of its environment." Effective leadership, which responds to technology-environment levels, has different styles in different disciplines.

Chem 47

Pfeffer, Jeffrey; Leong, Anthony and Strehl, Katherine. "Paradigm Development and Particularism: Journal Publication in Three Scientific Disciplines," Social Forces, 55 (June, 1977), 938-51.

(paradigm characteristics; publication practices; discipline comparisons)

Examines the relationship between the institutional affiliations of members of editorial boards and the institutional origins of papers published in major journals in chemistry, political science, and sociology. Data suggest that institutional representation on editorial boards has a strong effect on institutional publication rates in political science journals, a less significant effect in sociology, and no apparent effect in chemistry. The differences are traced to different degrees of paradigm development in the three disciplines: "extra scientific" criteria are more likely to influence judgement in low paradigm disciplines (political science, sociology) than in high paradigm disciplines (chemistry) that share agreed upon standards for the judgement of scientific research.

52

Chem 48

Pfeffer, Jeffrey; Salancik, Gerald R. and Moore, William L. "Archival Indicators of Paradigm Development of Academic Disciplines," unpublished paper, School of Business Administration, University of California Berkeley (first author), March, 1979.

(paradigm characteristics; graduate education; discipline comparisons)

for annotation see Biol 25

Chem 49

Rabkin, Y. M. and Lafitte-Houssat, J. J. "Cooperative Research in Petroleum Chemistry," Scientometrics, 1 (no. 4, 1979), 327-38.

(performance of research; career patterns; structure of literature)

Examines a research project in petroleum chemistry (American Petroleum Institute Research Project 6, 1926-1950) which identified the components of petroleum and contributed to new techniques in research and refining. A biographical study of scientists involved in the project found an unusual yet fairly uniform career profile, with most scientists having work experience in all three sectors (government, university, industry). Analysis of references in the 141 articles produced by the project suggests the following characteristics: 95% of the references were to articles appearing in scholarly journals; over half of the cited authors had been affiliated with the project; authors with university affiliation were the largest category of cited authors (20%); industry originated papers were cited with the shortest time lag (5.8 years); only a few among the cited and citing authors identified themselves as organic chemists. The authors conclude that "(T)he API research strategy oriented Project 6 in a direction whose novelty enabled scientists on the team to draw from knowledge not necessarily linked with the body of knowledge defined as petroleum chemistry."

Chem 50

Reskin, Barbara F. "Scientific Productivity and the Reward Structure of Science," American Sociological Review, 42 (June, 1977), 491-504.

(productivity; recognition and reward)

Study of a sample of 283 chemists provides information on factors linked to productivity measured at the end of the first postdoctoral decade. Data suggests that early productivity and quality of Ph.D. department affect a scientist's decade productivity, but the strength of this affect varies with the setting of first employment: early productivity is a stronger indicator for those employed in universities, but collegial recognition is a more important indicator for non-academic chemists.

Chem 51

Reskin, Barbara F. "Scientific Productivity, Sex and Location in the Institution of Science," American Journal of Sociology, 83 (March, 1978), 1235-43.

(productivity)

Comparison of publication rates of 229 men and 221 women chemists indicates that men outpublish women, but to a smaller extent than is commonly supposed. Women's productivity is linked more strongly than men's to pretigious postdoctral fellowships, employment in tenure-track university positions, and calibre of Ph.D. department.

Chem 52

Reskin, Barbara F. "Sex Differences in Status Attainment in Science: The Case of the Postdoctoral Fellowship," American Sociological Review, 41 (August, 1976), 597-612.

(recognition and reward; social stratification; career patterns)

Examines the status attainment process for a sample of 450 doctoral chemists, with particular focus on the effect of postdoctoral fellowships on career patterns and later productivity. The 231 male sample members' careers "exhibited the expected pattern of relationships: caliber of professional training and graduate school performance were associated with receipt of prestigious fellowship awards, which in turn was associated with high-status positions and scientific productivity . . . In contrast, female chemists accumulated no advantages with respect to postdoctoral experience." Data suggest that achievement norms do not operate for female scientists as they do for male scientists.

Chem 53

Rubenstein, Albert H. et. al. "Explorations on the Information-Seeking Style of Researchers," in Communication Among Scientists and Engineers, Carnot E. Nelson and Donald J. Pollock (eds.) Lexington, Massachusetts: D. C. Heath and Company, 1970.

(information exchange; discipline comparisons)

for annotation see Bioc 22

Chem 54

Russell, Colin A.; Coley, Noel G. and Roberts, Gerrilyn K. Chemists by Profession. Milton Keynes, England: Open University Press (Atlantic Highlands, New Jersey: Humanities Press), 1977.

(professional associations; development of disciplines and specialties)

A history of the (British) Royal Institute of Chemistry, commissioned for its centenary. Examines the development of the Institute, and the evolution of chemistry as a profession in Britain.

Chem 55

Sanford, Mark. Making It in Graduate School. Berkeley, California: Montaigne, Inc., 1976.

(graduate education; attitudes and values: discipline organization; discipline comparisons)

Investigates some of the ways in which assessment of performance in graduate school influences a student's decisions about what and how to study. Interviews with 72 graduate students at UC Berkeley (24 in the English Department, 25 in Economics, 23 in Chemistry) suggest that different evaluation structures and administrative requirements in the departments affect the degree to which "system beating" strategies are employed. Among those interviewed, 75% of the English graduate students, 48% of the Economics students and 18% of the Chemistry students have employed such strategies. Among the influential factors that vary between departments are: clarity of standards, frequency of assessment, number of assessors, ridigity of administrative requirements, adequacy of funding, time to degree.

Chem 56

Skolnik, Herman and Reese, Kenneth M. (eds.) A Century of Chemistry: The Role of Chemists and the American Chemical Society. Washington, D.C.: American Chemical Society, 1976.

(professional associations)

Centennial volume reviews the chemical profession and the activities of the American Chemical Society, during its first 100 years. Includes chapters on Historical Perspectives, Chemical Education, Professionalism, ACS Publications, Impact of Government, Public Affairs, Intersociety Relations, Governance, Headquarters and Staff Operations, ACS Divisions and Their Disciplines (1876-1976). The second half of the volume contains extensive records on officers, awards, and membership.

Chem 57

Small, Henry G. "Characteristics of Frequently Cited Papers in Chemistry," final report on NSF Contract C-795. Philadelphia: Institute for Scientific Information, 1974.

(structure of literature)

Analysis of literature in chemistry journals covered by the Science Citation Index identifies publications highly cited in 1972. A study of the publications finds: articles of theoretical importance are more dominant than methodological articles; "highly cited papers are associated with specific ideas and methods which are usually mentioned by name when the papers are cited;" chemists surveyed judged highly cited papers to be of higher quality than papers with few citations; referee evaluation of papers at the time of their submission to journals is not highly correlated to their later citation rate; applied chemistry literature seems to depend more heavily on other applied chemistry literature than on literature in basic chemistry; clusters of specialized subject areas characterize chemistry literature; authors of more than five highly cited papers have received larger than average awards from the National Science Foundation.

Chem 58

Small, Henry G. "Cross-Disciplinary Citation Patterns: A Study of the Interaction of the Chemical Literature with the Literature of the Biological and Physical Sciences," report on NSF Contract C-795, amendment 2. Philadelphia: Institute for Scientific Information, 1976.

(structure of literature)

Continues investigation of characteristics of highly cited items in chemistry journals (see Chem 57), focusing on those publications which are also highly cited in biological and physical science journals. Chemistry is linked to physical sciences primarily through book literature; the link to biological science is primarily through journal articles. In contrast to citation patterns within chemistry literature, "methodological" rather than "theoretical" publications dominate the cross disciplinary citations. Within the sample of highly cited chemistry publications, the cross cited literature is most frequently cited.

Chem 59

Smith, Bruce L. R. and Karlesky, Joseph J. The State of Academic Science: The Universities in the Nation's Research Effort. New York: Change Magazine Press, 1977.

(graduate education; funding of research; discipline comparisons)

for annotation see Biol 27

Chem 60

Storer, Norman. "Relations Among Scientific Disciplines," in The Social Contexts of Research, Saad Z. Nagi and Ronald G. Corwin (eds.) New York: Wiley Interscience, 1972.

(paradigm characteristics; recognition and reward; discipline comparisons)

for annotation see Biol 28

Chem 61

Strauss, Anselm and Rainwater, Lee. The Professional Scientists: A Study of American Chemists. Chicago: Aldine, 1962.

(attitudes and values; career patterns; professional associations)

Study of how chemists view their careers, conducted by Social Research, Inc. at the request of the American Chemical Society. Survey included chemists in academic, research, industrial and administrative settings. Includes discussion of work experiences (recruitment processes, mobility, morale), image of professional status, and the role of professional associations (functions and leadership of the ACS, meaning of society membership).

Chem 62

Wilkes, John M. "Cognitive Issues Arising from Study in the Sociology of Science," paper prepared for the Annual Meeting of the American Psychological Association. New York: September, 1979.

(discovery process; paradigm characteristics; discipline comparisons)

Traces the study of creativity in psychology of science and sociology of science and focuses on recent work which examines "cognitive styles" in science. Data on 65 to 75 academic scientists in each of four fields (chemistry, economics, physics, sociology) suggest that there is a strong relation between field paradigm characteristics and the dominant cognitive style (problem formulation or problem solution) of researchers in the discipline.

Chem 63

Wilkes, John and Neumann, Yoram. "The Influence of 'Style' on Choice of Specialty, Review Procedures and Academic Success," working paper, Worcester Polytechnical Institute (first author), March, 1979 (submitted to *Journal of Higher Education*).

(discovery process; performance of research; paradigm characteristics; career patterns; discipline comparisons)

Two cognitive styles are identified: ability to formulate problems, and ability to solve problems. Data on over 260 scientists in chemistry, economics, physics and sociology suggest that scientists in different fields tend to have different cognitive styles. The authors discuss the relation of cognitive style to organization of research, patterns of publication and career advancement. Possible effects of personal differences in cognitive style on peer review evaluation procedures are examined.

Chem 64

Yoels, William C. and Yoels, Brenda G. "The Structure of Scientific Fields and the Allocation of Editorships on Scientific Journals," *Sociological Quarterly*, 15 (Spring, 1974), 264-76.

(paradigm characteristics; recognition and reward; discipline comparisons)

for annotation see Socl 63

Chem 65

Zenzen, Michael and Restivo, Sal. "The Mysterious Morphology of Immiscible Liquids: The Discovery and Pursuit of an Anomaly in Colloid Chemistry," paper drafted for presentation at the Sociology of Sciences Yearbook (vol. 5) Conference. Montreal: October, 1979.

(discovery process; information exchange)

A "report on the social and cognitive factors involved in the discovery and pursuit of an anomaly in the colloid chemistry of immiscible liquids. It is based on in-depth interviews with the principal researchers, the analysis of laboratory notebooks, memos and publications, and observations in the laboratory." The focus of the study is a university laboratory. The authors' discussion of their findings emphasizes "the way in which communication and contingencies continuously influence the course of scientific research."

Chem 66

Zinberg, Dorothy S. "Education Through Science: The Early Stages of Career Development in Chemistry," Social Studies of Science, 6 (May 1976), 215-46.

(education; attitudes and values; career patterns)

Study of undergraduate students in the chemistry department of a British university examines attitudes toward science and perceptions of educational experience. Interviews and questionnaires are administered to the same group of students at three different points in their education and career. The 1968-69 study "explored the vicissitudes of the first year in university". The 1971 investigation, carried out at the end of the third year between final examinations and graduation, "focused on student evaluations of the course and its relation to postgraduation plans." The 1973 study investigated "students' estimates of their personal and professional achievements two years after graduation."

Chem 67

Zinberg, Dorothy S. "The Widening Gap: Attitudes of First Year Students and Staff Towards Chemistry, Science, Careers and Commitment," Science Studies 1 (October, 1971), 287-313.

(education; attitudes and values; discipline organization)

Study of the chemistry department at a British university. Interviews with faculty and students and questionnaires answered by students provide the basis for examination of the social organization of the department, the expectations and impressions of first year students, and the extent to which experiences and values in science and science education are shared by students and faculty.

Chem 68

Zuckerman, Harriet A. "Patterns of Name Ordering Among Authors of Scientific Papers: A Study of Social Symbolism and its Ambiguity," American Journal of Sociology, 74 (November, 1968), 276-91.

(recognition and reward; performance of research; discipline comparisons)

for annotation see Biol 31

Chem 69

Zuckerman, Harriet and Merton, Robert. "Age, Aging and Age Structure in Science," in The Sociology of Science, Robert K. Merton. Chicago: University of Chicago Press, 1973.

(productivity--age; paradigm characteristics; discipline comparisons)

for annotation see Biol 32

EARTH AND SPACE SCIENCES

E&Sp 1

Baum, W. A. "A Study of Reference Citations in the Journal of Meteorology and the Quarterly Journal of the Royal Meteorological Society," Bulletin of the American Meteorological Society, 36 (no. 2, 1955), 61-63.

(structure of literature; national comparisons)

Compares citation patterns in a U.S. and a British meteorology journal (1944-1953). Finds similar patterns of citation of their own and foreign literature, although British authors show slightly higher use of older literature than do U.S. authors. Low utilization of Soviet work is attributed to language difficulties, and suggests a need for increased survey and translation efforts. (This annotation is drawn from Citation Analysis: An Annotated Bibliography, S. Cozzens, et al. Philadelphia: Institute for Scientific Information, May, 1978.)

E&Sp 2

Bayer, Alan E. and Dutton, Jeffrey E. "Career Age and Research-Professional Activities of Academic Scientists," Journal of Higher Education, 48 (May/June, 1977), 259-82.

(productivity--age; discipline comparisons)

for annotation see Bioc 1

E&Sp 3

Brush, Stephen. "Planetary Science: From Underground to Underdog," Scientia, 113 (Autumn, 1978), 771-87.

(development of disciplines and specialties; social stratification)

Examines the effect of a hierarchy among subfields of physics on the definition of fundamental issues, on career choice, and on historical interpretation. Focuses on shifts in the status of planetary physics (study of the earth, atmosphere and solar system): before the 19th Century, planetary science was recognized as a significant area of work, attracted great scientists, enjoyed social status, and stimulated discoveries in areas now defined as pure science. Today among scientists it does not have the prestige associated with pure physics (the study of properties of matter and energy). This change is traced not only to the effects of specialization and professionalization, but to the role of particular scientists and events. The inferior status that planetary science has in the eyes of physicists persists despite the attraction of available research funds (recently for space sciences, currently for environmental work).

E&Sp 4

Center for Research in Scientific Communication. "The Information-Dissemination Process Associated with the Production of Journal Articles on Geophysics," JHU-CRSC Report #14, Baltimore: Johns Hopkins University, Department of Psychology, May, 1970.

(information exchange)

"Citation analysis is used . . . to locate the 8 most relevant journals in geophysics. The flow of information in the field was documented by questionnaires sent to the authors of papers appearing in 1968, which asked about the timing of: initiation of research, oral reports, and communications on its progress, circulation of preprints, submittal of completed manuscript to a journal, publication, initiation of new work, appearance of article in abstract journal, citation by others, and inclusion of the work in a review of the field. In general, public dissemination of information comes late in the process, since informal feed back from colleagues is important to the finished manuscript. Comparisons are made between academic and non-academic authors, U.S. and foreign employed authors, and between American Geophysical Union journals and others." (From Citation Analysis: An Annotated Bibliography, S. Cozzens, et al. Philadelphia: Institute for Scientific Information, May, 1978.)

E&Sp 5

Cole, Stephen. "Age and Scientific Performance," American Journal of Sociology, 84 (January, 1979), 958-77.

(productivity--age; paradigm characteristics; discipline comparisons)

for annotation see Chem 15

E&Sp 6

Cole, Stephen; Cole, Jonathan and Dietrich, Lorraine. "Measuring the Cognitive State of Scientific Disciplines," in Toward a Metric of Science, Y. Elkana, et al. (eds.) New York: John Wiley and Sons, 1978.

(paradigm characteristics; discipline comparisons)

for annotation see Bioc 5

E&Sp 7

Cole, Stephen; Rubin, Leonard and Cole, Jonathan R. Peer Review in the National Science Foundation: Phase One of a Study. Washington, D.C.: National Academy of Science, 1978.

(funding of research; discipline comparisons)

for annotation see Bioc 6

E&Sp 8

Gilbert, G. Nigel. "The Development of Science and Scientific Knowledge: The Case of Radar Meteor Research," in Perspectives on the Emergence of Scientific Disciplines, G. Lemaine et al. (eds.) Chicago, Aldine, 1976.

(development of disciplines and specialties; discipline comparisons)

Focuses on the interaction of social and intellectual factors in the rise and decline of radar meteor science as a distict area of research. Suggests that there is a direct relationship between the growth of knowledge in this area and the careers of radar scientists. Those scientists who opened up fruitful lines of scientific inquiry (stimulated by the application of war-developed radar techniques to new problems) received the greatest recognition and reward from the scientific community. Those conditions motivated an expanding scope of research. The new problems explored eventually became marginal to the original focus of radar meteor research, and merged with the established specialty of ionospheric physics. Comparisons with the development of disciplines and specialties in psychology, biology and mathematics are included.

E&Sp 9

Gillmor. C. S. "Citation Characteristics of the JATP Literature," Journal of Atmospheric and Terrestrial Physics, 37 (November, 1975), 1401-04.

(structure of literature--citation rates)

Examines characteristics of papers published in the Journal of Atmospheric and Terrestrial Physics, 1967-1973. Papers receive the bulk of their citations in the first three or four years after publication, and 30% of the citations are from subsequent JATP articles. Articles of a theoretical nature actively receive citations for a longer period than do articles of an experimental or technical nature. Among the highly cited papers, the top 1% receive 10% of all citations, the top 12% receive 50% of the citations and the bottom 50% receive 11% of the citations. Rankings of papers by citations received correspond closely to editorial ratings for the papers, which "suggests that the general readership would agree with editorial choice in the selection of papers most appropriate for publication in JATP."

E&Sp 10

Gillmor, C. S. and Terman, C. J. "Communication Modes of Geophysics: The Case of Ionospheric Physics," EOS, 54 (October, 1973), 900-08.

(information exchange)

Discusses the growth of the field of ionospheric physics, with particular attention given to communication patterns and journal specialization. The study is based on three sources--a bibliography of ionospheric physics abstracts (1920-1960); citation data from Science Citation Index; a survey of 450 ionospheric physicists (1972). Several modes of communication are examined: journals; personal informal meetings; society meetings and conferences; seminars; monographs; correspon dence. Different aspects of research--technical information, current awareness, theory--are served by different modes of communication. Journals receive the highest rating for serving all three aspects of research. Society meetings are the most effective mode for maintaining current awareness, and monographs are the best mode of theory dissemination. Twenty four journals which publish ionospheric physics literature are categorized by the research functions they serve.

E&Sp 11

Hallan, A. "Alfred Wegener and the Hypothesis of Continental Drift," Scientific American, 232 (February, 1975), 88-97.

(discovery process; social stratification)

Examines the work of Alfred Wegener, and the attitudes of his contemporaries toward his hypothesis of continental drift (proposed in 1912). Among the issues discussed are meteorologist Wegener's status as an amateur or "outsider" among geologists, the career risk of any geologists who placed themselves in opposition to prevailing theories by supporting Wegener's theory, and the greater receptivity shown by geophysicists at early stages. The author suggests that acceptance of the theory in the 1960's was compelled by new evidence derived from discoveries in geophysics and oceanography.

E&Sp 12

Kohut, Joseph J. "A Comparative Analysis of Obsolescence Patterns of the U.S. Geoscience Literature," Journal of the American Society for Information Science, 25 (July/August, 1974), 242-51.

(structure of literature--citation rates)

Study of literature in twelve geoscience journals examines specialty differences in the relation between age of literature and citation frequency. Apparent obsolescence rates vary across specialties, with literature from physics or chemistry oriented subdisciplines having relatively short "half-lives" and literature from biology oriented subdisciplines having relatively long "half-lives." Obsolescence rates of traditional geoscience fields seem to show little variation, in contrast to fast-changing fields (such as solid earth geophysics). The characteristics of classical and ephemeral literature are disscussed, and the effect of growth of literature on obsolescence is examined.

E&Sp 13

Kruytbosch, Carlos with Papenfuss, Susan. "Some Social and Organizational Characteristics of Breakthrough Science: An Analysis of Major Innovations in Four Fields of Science, 1950-1976," paper presented at the IX World Congress of Sociology, Uppsala, Sweden, August 17, 1978.

(discovery process; funding of research; discipline comparisons)

for annotation see Astr 6

E&Sp 14

McAllister, Paul R.; Anderson, Richard C. and Narin, Francis. "Comparison of Peer and Citation Assessment of the Influence of Scientific Journals," Journal of the American Society for Information Science, (May, 1980), 147-52.

(structure of literature--journal influence; discipline comparisons)

for annotation see Biol 15.

E&Sp 15

Menard, Henry W. Science: Growth and Change. Cambridge, Massachusetts: Harvard University Press, 1971.

(development of disciplines and specialties; structure of literature)

Studies growth rates in subfields of geology, and discusses the effect of variable growth on education, research, publication and citation, recognition and careers. Data suggest that fast growing subfields enjoy greater research support and have higher correlations with measures of scientific achievement than slowly growing or dormant subfields. Includes the following chapters: (1) "Introduction," (2) "Measuring the Growth of Literature," (3) "Growth of Sciences," (4) "Population and Other Factors Affecting Growth," (5) "Papers and Citation and Scientific Fame," (6) "Scientific Literature," (7) "Education," (8) "A Department of Science," (9) "Scientists in Society."

E&Sp 16

Middleton, Gerard V. "Citation Patterns of Papers Published in the Journal of Sedimentary Petrology," Journal of Sedimentary Petrology, 44 (March, 1974), 3-6.

(structure of literature--citation rates)

Examines citation rates for papers published in JSP, focusing on those papers selected annually as "best" or "outstanding." The data suggest that papers which have received the award have a higher than average citation rate, but are rarely the most frequently cited paper of the year. The author discusses the controversies over the use of citation analysis.

E&Sp 17

Mitroff, Ian I. "Norms and Counter-Norms in a Select Group of the Apollo Moon Scientists: A Case Study of the Ambivalence of Scientists," American Sociological Review, 39 (August, 1974), 579-95.

(attitudes and values)

Information from interviews with 42 lunar scientists associated with the Apollo missions provides the basis for an examination of standards that operate in the scientific community. The paper supports the concept that science, like other social institutions, reflects "potentially conflicting sets of norms." The attitudes and practices of the scientists as they participated in research on lunar rocks suggest that in addition to the traditional scientific norms, there exists a set of counter-norms: elements of community, rationality, emotional neutrality, universal criteria of judgement, disinterestedness and organized skepticism are paralleled by secrecy, non-rationality, commitment, judgement based on personal or social attributes, "interestedness," and dogmatism. Traditional norms are associated with well defined problems, but the counter-norms become apparent in situations dealing with "ill structured" problems. The author discusses the idea that ambivalence is a necessary condition of science.

E&Sp 18

Mitroff, Ian I. The Subjective Side of Science: A Philosophical Inquiry into the Psychology of the Apollo Moon Scientists. Amsterdam: Elsevier Scientific Publishing Company, 1974.

(attitudes and values; discovery process)

Suggests an improved model of the practice of science founded on a "critical appraisal of the actual behavior of scientists." The study is based on interviews with more than 40 scientists who participated in the Apollo lunar missions. Four separate interviews, conducted over a period of three years, investigate the attitudes, beliefs and scientific practices of scientists, and examine how their ideas about the moon changed in response to the scientific data from each Apollo mission. Discusses implications of the idea that scientific knowledge is a product of a committed observer.

E&Sp 19

Narin, Francis. Evaluative Bibliometrics. New Jersey: Computer Horizons, Inc., 1976.

(structure of literature--journal influence; discipline comparisons)

for annotation see Biol 21

E&Sp 20

Stewart, John A. Change in Cognitive and Social Structures During a Scientific Revolution: Plate Tectonics and Geology. Ph.D. dissertation, University of Wisconsin (Madison), 1979.

(paradigm characteristics; discovery process; structure of literature--citation rates)

"The recent acceptance of continental drift or plate tectonics theory is examined as the development of a new paradigm in the geological sciences . . . Scientific specialties are viewed as social organizations whose members are 'negotiating' which beliefs and research results will be accepted as 'true.' . . . This perspective is supported by information obtained from interviews with many of the scientists who developed the theory. It is shown that co-citation analysis is able to identify the major publications in plate tectonics for 1970, and this technique is used to examine how plate tectonics developed in the early 1970s. Finally, a model of the citation process is proposed and applied to a sample of geological articles. These results show that the cognitive and contextual aspects of articles are more important than the characteristics of their authors in causing the articles to be cited by other researchers." (Author's abstract.)

E&Sp 21

Stewart, John A. "Cognitive and Social Predictors of the Recognition of Articles: A Conceptual Model," paper presented at the American Sociological Association meetings, Boston, 1979.

(structure of literature--citation rates; recognition and reward)

Model of the citation process and its application focuses on the article, not the scientist, as the fundamental unit of analysis. The propensity for an article to be cited is seen as a function of "quality", author characteristics, and time since publication. "The implications of this model for studies examining citations to articles and scientists are described, including the conceptual and methodological implications for the study of inequality and of the relationships between 'quality', 'recognition', and 'quantity' of productivity. Finally, an empirical application of the model to the analysis of articles in the geosciences provides support for the 'Matthew Effect', the important role of 'quality', and the primary importance of cognitive and contextual aspects of articles as determinants of their different propensities to be cited." (Author's abstract.)

E&Sp 22

Storer, Norman. "Relations Among Scientific Disciplines," in The Social Contexts of Research, Saad Z. Nagi and Ronald G. Corwin (eds.) New York: Wiley Interscience, 1972.

(paradigm characteristics; recognition and reward; discipline comparisons)

for annotation see Biol 28

ECONOMICS

Econ 1

Bayer, Alan E. and Dutton, Jeffrey E. "Career Age and Research-Professional Activities of Academic Scientists," Journal of Higher Education, 48 (May/June 1977), 259-82.

(productivity--age; discipline comparisons)

for annotation see Bioc 1

Econ 2

Billings, B. B. and Viksnins, G. J. "The Relative Quality of Economics Journals: An Alternative Rating System," Western Economics Journal, 10 (December, 1972), 467-69. Authors' abstract appears in Journal of Economic Literature, 11 (September, 1973), 1183.

(structure of literature--journal influence)

The journals of three major professional societies in economics are examined in order to determine the referencing patterns of their articles (journals studied: American Economic Review, Econometrica, Economic Journal). For the period studied (1969-71) there is a hierarchy of referenced journals, with articles from the Journal of Political Economics, Review of Economic Studies and Review of Economics and Statistics receiving the highest number of citations.

Econ 3

Bonjean, Charles M. and Hullum, Jan. "Reasons for Journal Rejection: An Analysis of 600 Manuscripts," PS, 9 (Fall, 1978), 480-83.

(publication practices)

Analyzes the rejection of 600 manuscripts (200 each in political science, economics and sociology) submitted to the interdisciplinary journal Social Science Quarterly. Five major reasons for rejection are identified: manuscript unimportant or insignificant (29%); methodological flaws (26%); theoretical framework unsound (21%); editorial/journal policies (13%); poor presentation (10%). Details are provided for each field. Agreement rates among evaluators are discussed. The growth of research notes in all three fields is noted as evidence of increasing competition for publication space.

Econ 4

Cartter, Allan M. An Assessment of Quality in Graduate Education. Washington, D. C.: American Council on Education, 1966.

(university ratings)

Thirty academic disciplines are included in a study to evaluate the quality of graduate education in departments at 106 Ph.D. granting institutions. Over 4,000 faculty of various age and rank answered questionnaires that provide data for rating the quality of graduate faculty and the effectiveness of doctoral programs. Economics, political science and physics are among the disciplines selected for more detailed analysis, in "an effort to relate subjective ratings to certain 'objective' factors involving departments." Among the factors considered are: ratings by a select panel, departmental publications index, institutional background and current affiliation of respondents, regional variations, and faculty salaries.

Econ 5

Cole, Stephen; Rubin, Leonard and Cole, Jonathan R. Peer Review in the National Science Foundation: Phase One of a Study. Washington, D.C.: National Academy of Sciences, 1978.

(funding of research; discipline comparisons)

for annotation see Bioc 6

Econ 6

Collins, Randall. "The Organization of the Intellectual World," in Conflict Sociology, Randall Collins. New York: Academic Press, 1979.

(discipline organization; competition; discipline comparisons)

"A conflict theory of scientific organization and intellectual production is proposed. The external organizational roles occupied by intellectuals (political, practical, leisure entertainment, and teaching) affect the kind of intellectual contents they produce. Evidence for these hypotheses is offered from an historical sample of figures in six social sciences: history, economics, psychology, anthropology, sociology, and political science. The internal structure of a science is treated as an invisible organization, and hypotheses are proposed from organization theory regarding the effects of high or low task uncertainty and high or low coordination needs upon the social structures of various sciences. Internal competition within science is discussed from the case of intellectual factions in seventeenth century physics." (Author's abstract.)

Econ 7

Decker, Robert L. "Success and Attrition Characteristics in Graduate Studies," Journal of Economic Education, 4 (Spring, 1973), 130-37.

(graduate education)

Examines characteristics of 473 economics students who entered the Ph.D. program at the University of California at Berkeley between 1956 and 1965. Data show that in 1971, 33% of the students had completed the program, 9% were still in the program, and nearly 60% had left the program with a terminal M.A. or no degree. Several factors contributing to success and attrition are analyzed, including undergraduate education; elapsed time from completion of B.A. to entrance into program; M.A. status; sex; university policies.

Econ 8

Deutsch, Karl W.; Platt, John and Senghass, Dieter. "Conditions Favoring Major Advances in Social Science," *Science*, 171 (February 5, 1971), 450-59.

(discovery process; discipline comparisons)

Outlines criteria for recognizing major advances in social science, and examines sixty-two achievements from the fields of psychology, anthropology, sociology, economics, political science, philosophy and history of science, and mathematics. Several intellectual and organizational aspects are considered for each achievement: role of theory and method; frequency of advances; role of individual vs. team; ages of contributors; quantitative and qualitative aspects of achievement; requirements in capital, manpower and time; social and political setting; disciplinary/interdisciplinary source of ideas; impetus of practical demands; time delay in impact.

Econ 9

Eagly, R. V. "Economics Journals as a Communication Network," *Journal of Economic Literature*, 13 (September, 1975), 878-88.

(structure of literature--journal influence; information exchange)

Examines the reciprocal citation structure of eighteen economics journals in order to identify patterns of information flow. The data suggest that there is a discernable structure in the journal network, with core journals that have a high sending/receiving ratio and high prestige rankings. The study provides a quantitative measure of information flow in the economics profession.

Econ 10

Furner, Mary O. *Advocacy and Objectivity: A Crisis in the Professionalization of American Social Science, 1865-1905*. Lexington: University Press of Kentucky, 1975.

(development of disciplines and specialties; professional associations)

Traces the decline of amateur social science and the rise of professional social science, with focus on the tension between scholarship and reform. Traces the growth of professional academic training, the founding of disciplinary professional organizations (American Economic Association, American Psychological Association, American Sociological Association), and the decline of the American Social Science Association.

Econ 11

Hansen, W. L., et. al. "The Market for New Ph.D. Economists: An Econometric Model," paper presented at annual meeting of the American Economic Association, New York, December, 1977.

(career patterns; graduate education)

Develops a new model of the market for new Ph.D.'s in economics that incorporates several variables: academic market, government market, level of graduate school enrollment. Forecasts based on this model predict a reduction in enrollments as relative wages decline; this wage response would moderate, though not resolve, excess supply of new Ph.D.'s.

Econ 12

Lovell, Michael C. "The Production of Economic Literature: An Interpretation," Journal of Economic Literature, 11 (March, 1973), 27-55.

(productivity; recognition and reward)

An economic analysis of the growth of economics literature, using a production model as a device for describing publication trends. The study focuses on several questions and relationships: "What determines the pace of scholarly activity in economics? Is the production function for economic knowledge subject to increasing or decreasing returns to scale? How rapidly does economic knowledge depreciate? Is the scholar's Ph.D. equally subject to depreciation with the passage of time? How is output of economic knowledge related to the supply of scholars?"

Econ 13

Moore, W. J. "The Relative Quality of Graduate Programs in Economics, 1958-1972: Who Published and Who Perished," Western Economics Journal, 11 (March, 1973), 1-23. Author's abstract appears in Journal of Economic Literature, 11 (December, 1973), 1614.

(university ratings)

Examines the journal publication rates of 94 graduate departments in economics, and discusses several "publication models" for estimating departmental quality. Departmental quality rankings derived from publication data are compared to American Council on Education evaluations, and widespread differences are found within and between the major ACE categories.

Econ 14

Pfeffer, Jeffrey; Salancik, Gerald R. and Leblebici, Huseyin. "The Effect of Uncertainty on the Use of Social Influence in Organizational Decision Making," Administrative Science Quarterly, 21 (June, 1976), 227-46.

(paradigm characteristics; funding of research; discipline comparisons)

Explores hypothesis that social influence in decisions varies with uncertainty. Paradigm development is used as a measure of certainty in science. Analysis of National Science Foundation grant allocations in economics, social psychology, sociology and political science finds "that average year to year stability in grant allocations to institutions was lower the less developed the paradigm and that (advisory) panel membership affected those allocations more." The authors suggest that "low paradigm development creates uncertainty in the decision making and judgement process. This uncertainty is resolved through the use of socially based particularistic criteria" rather than universalistic criteria.

Econ 15

Pfeffer, Jeffrey; Salancik, Gerald R. and Moore, William L. "Archival Indicators of Paradigm Development of Academic Disciplines," unpublished paper, School of Business Administration, University of California, Berkeley (first author), March, 1979.

(paradigm characteristics; graduate education; discipline comparisons)

for annotation see Biol 25

Econ 16

Quandt, R. E. "Some Quantitative Aspects of The Economics Journal Literature," Journal of Political Economy, 84 (August, 1974), 741-55. Author's abstract appears in Journal of Economic Literature, 14 (December, 1976), 1543.

(structure of literature; recognition and reward; discipline comparisons)

Examines the citation practices of articles in eight economics journals at 10 year intervals. Trends in growth and in mean age of citations parallel findings for other fields. Inter-journal citation patterns do indicate that there is a hierarchy among the journals, and there is an observed tendency for articles to cite articles that have been published by the same journal. A study of highly cited authors finds that Nobel prize winners often appear more than once on lists compiled a decade apart.

Econ 17

Reynolds, Paul Davidson. "Value Dilemmas in the Professional Conduct of Social Science," International Social Science Journal, 27 (no. 4, 1975), 563-611.

(attitudes and values; professional associations)

Reports on an international survey of codes of ethics adopted or being considered by professional social science organizations (including the fields of anthropology, economics, political science, psychiatry, psychology, sociology.) Most codes have considered principles related to the use of human subjects in research, but few have addressed the problem of the uses of sponsored research.

Econ 18

Sanford, Mark. Making It in Graduate School. Berkeley, California: Montaigne, Inc., 1976.

(graduate education; attitudes and values; discipline organization; discipline comparisons)

for annotation see Chem 55

Econ 19

Siegfried, John J. "The Publishing of Economic Papers and its Impact on Graduate Faculty Ratings, 1960-69," Journal of Economic Literature, 10 (March, 1972), 31-47.

(productivity; university ratings; social stratification)

Traces institutional affiliations of authors of papers in five major economics journals and thirteen specialty and regionally based journals. Examines "evidence concerning bias toward participation of large schools in American Economic Association meetings, of bias toward selected schools within the large school group," and "explores the relationship between the 'quality of faculty' of an institution as viewed by professional economists and their quantity of publishing in professional journals."

Econ 20

Siegfried, John J. and White, Kenneth J. "Financial Rewards to Research and Teaching: A Case Study of Academic Economists," American Economic Review, 53 (May, 1973), 309-15.

(discipline organization; recognition and reward; graduate education)

Examines the salary structure of the economics department of a large public university (University of Wisconsin--Madison, with an economics faculty of 45 professors) to identify the relative rewards and the relative values regarding teaching and research priorities. Since salaries in this case are set through an internal evaluation process, a model is proposed for salary determination based on current salary, experience, cumulative research output, teaching productivity and administrative duties. Analysis of the data suggests "that while teaching is rewarded, research output and administrative experience are the principal routes to financial success. The statistical significance and quantitatively larger impact of research output appears to support the popular hypothesis that the faculty reward structure at large public universities encourages research, possibly at the expense of teaching quality."

Econ 21

Small, H. G. and Crane, D. "Specialties and Disciplines in Science and Social Science: An Examination of their Structure Using Citation Indexes," Scientometrics, 1 (August, 1979), 445-61.

(structure of literature; discipline comparisons)

Examines the development of knowledge in the social sciences, and makes comparisons with natural science. Co-citation analysis of the Social Science Citation Index for the period 1972-1974 identifies over 1200 research clusters. The home discipline (economics, psychology, sociology) of a cluster is determined by its journals of publication. Citation patterns in the social science disciplines are compared with those in high energy physics. Using measures of age of cited publication, proportion of references to journals or books, and "propensity to cluster," data suggest that psychology is most like the natural sciences, followed by economics and sociology. Within each social science discipline, there are networks connecting the various specialty clusters. Few citation links are found between the three disciplines. Each discipline does have links with disciplines other than these three. In contrast, high energy physics has no links to other disciplines, and only a few weak links to other specialties in physics.

Econ 22

Stigler, G. J. and Friedland C. "The Citation Practices of Doctorates in Economics," Journal of Political Economy, 83 (1975), 477-507.

(structure of literature--citation rates; social stratification)

"In order to test the existence of 'schools of thought,' or the extent to which universities influence the later attitudes of their doctorates, the authors tabulate the citation practices of the 1950-1955 economic doctorates from 6 major universities (Berkely, Chicago, Columbia, Harvard, MIT, Wisconsin), in the fields of value theory and monetary theory. Universities tend to accept as graduate students their own undergraduates, and tend to hire their own graduates. A certain amount of regionalism is also seen . . . The authors develop an 'index of parochialism' (roughly the ratio of a school's self-citation rate to its share of the total citation from all schools). Citations are also classfied as favorable, unfavorable, and neutral, and this enables the authors to locate groups of allies. In some cases individual schools' citations patterns favor one group of allies or another. On the whole however, the effects of parochialism, ideological preferences, etc. are weak." (From Citation Analysis: An Annotated Bibliography, S. Cozzens, et. al. Philadelphia: Institute for Scientific Information, May, 1978.)

Econ 23

Storer, Norman. "Relations Among Scientific Disciplines," in The Social Contexts of Research, Saad Z. Nagi and Ronald G. Corwin (eds.) New York: Wiley Interscience, 1972.

(paradigm characteristics; recognition and reward; discipline comparisons)

for annotation see Biol 28

Econ 24

Tuckman, Howard P. and Leahey, Jack. "What is an Article Worth?" Journal of Political Economy, 83 (October, 1975), 951-67.

(productivity--age; recognition and reward)

Examines the publication output of a cross section of university economists, and analyzes the monetary value of publications in terms of salary, promotion, career options, and mobility. There are considerable lifetime returns to publication of the first article ($12,340 for an assistant professor, $10,256 for an associate professor, and $6,958 for a full professor), but there are diminishing returns to additional publications. A possible explanation for declining output with increasing age may be that well published older faculty receive slight gain from additional publications, and are drawn to more rewarding projects (consulting, editorial positions, etc.).

Econ 25

Weber, J. A. "Economic Journals: Policies, Trends, and Problems," Southern Economic Journal, 38 (April, 1972), 559-65. Author's abstract appears in Journal of Economic Literature 10 (June, 1973), 765.

(publication practices)

Survey of economics journals examines the consequences of the submission of an increasing number of quality manuscripts. Examines trends in acceptance rates, reasons for rejection of articles, and time lags in publication, and considers the implications of these trends for editors, authors and information users. Despite "drastically reduced" acceptance rates, there is a growing time lag between submission and publication.

Econ 26

Wilkes, John M. "Cognitive Issues Arising from Study in the Sociology of Science," paper prepared for the Annual Meeting of the American Psychological Association. New York: September, 1979.

(discovery process; paradigm characteristics; discipline comparisons)

for annotation see Chem 62

Econ 27

Wilkes, John and Neumann, Yoram. "The Influence of 'Style' on Choice of Specialty, Review Procedures and Academic Success," working paper, Worcester Polytechnical Institute (first author), March, 1979 (submitted to Journal of Higher Education).

(discovery process; performance of research; paradigm characteristics; career patterns; discipline comparisons)

for annotation see Chem 63

Econ 28

Yoels, William C. and Yoels, Brenda G. "The Structure of Scientific Fields and the Allocation of Editorships on Scientific Journals," Sociological Quarterly, 15 (Spring, 1974), 264-76.

(paradigm characteristics; recognition and reward; discipline comparisons)

for annotation see Socl 63

ENGINEERING

Engr 1

Bayer, Alan E. and Dutton, Jeffrey E. "Career Age and Research-Professional Activities of Academic Scientists," Journal of Higher Education, 48 (May/June 1977), 259-82.

(productivity--age; discipline comparisons)

for annotation see Bioc 1

Engr 2

Bernier, C. L.; Gill, W. N. and Hunt, R. G. "Measures of Excellence of Engineering and Science Departments: A Chemical Engineering Example," Chemical Engineering Education, 9 (no. 4, 1975), 194-97.

(university ratings; productivity--age)

Compares rankings of twenty-one departments of chemical engineering with fifteen different measures of excellence (including citation counts, level of research support, peer evaluations, number of publications, Ph.D.s produced). Department size seems to be important in measures of quality. Low correlation between the number of articles per department and the Roose-Anderson ratings contrasts with findings in other fields (see Hagstrom, Biol 11), "suggesting a difference in impact for applied science articles." Measures of productivity by age group show peak between age 40 and 44. (This annotation is drawn from Citation Analysis: An Annotated Bibliography, S. Cozzens, et. al. Philadelphia: Institute for Scientific Information, May, 1978.)

Engr 3

Besterfield, Dale H. "Engineering, Engineering Technology, and Industrial Technology Graduates: A Comparative Study," 69 (May, 1979), 795-97.

(education; career patterns)

Compares career experiences of graduates who received degrees in engineering, engineering technology and industrial technology. A survey of 104 engineers (over thirty from each of the three disciplines) ten years after graduation finds no significant differences in type of employment, relevance of curriculum to job experience, job mobility, job satisfaction and salary. The author suggests that all three engineering programs are viable and effective.

Engr 4

Cawkell, A. E. "Search Strategy, Construction and Use of Citation Networks, With a Socio-Scientific Example: Amorphous Semi-Conductors and S. R. Ovshinsky," Journal of the American Society for Information Science, 25 (March/April, 1974), 124-30.

(structure of literature--specialty groups; development of disciplines and specialties)

Constructs a citation network for literature on amorphous semi-conductors, and compares it to a social-historical study of the field (see also Engr 9). The citation network reveals social and historical developments in the field through identification of "nodal" articles and authors. In particular, the controversy surrounding the development of semi-conductor switches by S. R. Ovshinsky can be noted and traced through citation analysis. The movement of ideas from basic to applied science is also detected by the citation network method.

Engr 5

Danielson, Lee E. Characteristics of Engineers and Scientists. Ann Arbor: Bureau of Industrial Relations, University of Michigan, 1960.

(recognition and reward; discipline organization)

Includes discussion of differences between scientists and engineers in industry. Engineers historically have worked in industry, and gain prestige from promotion within the company. High positions in engineering professional societies are occupied by engineers who have moved into administration. Scientists in industry face sometimes conflicting demands: company demands to conduct marketable research, and professional demands to contribute to fundamental knowledge. Industrial scientists are less dominant than academicians in scientific societies.

Engr 6

Eisemon, Thomas O. and Rabkin, Yakov. "Science in a Bilingual Society: The Case of Two Engineering Schools in Quebec," Social Studies of Science, 8 (May, 1978), 245-56.

(attitudes and values; recognition and reward)

Considers the influence of language of work on the professional attitudes and activities of academic engineers. Data from interviews with 130 engineers at two universities in Quebec (a French-medium and an English-medium university) identify differences in professional attitudes and activities. The effect of language of work on networks of professional communication and opportunities for professional recognition are discussed.

Engr 7

Frame, J. Davidson; Narin, Francis and Carpenter, Mark P. "The Distribution of World Science," Social Studies of Science, 7 (November, 1977), 501-16.

(structure of literature; national comparisons; discipline comparisons)

for annotation see Biol 5

Engr 8

Friedlander, Frank. "Performance and Orientation Structure of Research Scientists," Organizational Behavior and Human Performance, 6 (March 1971), 169-83.

(performance of research; discipline comparisons)

for annotation see Biol 6

Engr 9

Gibbons, Michael and King, Philip. "The Development of Ovonic Switches: A Case Study of Scientific Controversy," Science Studies, 2 (October, 1972), 295.

(recognition and reward; attitudes and values)

Study of social behavior in the scientific community analyzes the controversy surrounding the development by S. R. Ovshinsky of a new semi-conductor switch. Ovshinsky's promotional activities and the reactions of solid state physicists are examined in terms of an exchange-recognition model of science. Discusses Ovshinsky's "outsider" status and his contravention of some of the norms and values of the scientific community, and touches on the role of large science-based corporations in solid state physics. (See also Engr 4).

Engr 10

Goldner, Fred H. and Ritti R. R. "Professionalization as Career Immobility," American Journal of Sociology, 72 (March, 1967), 489-502.

(discipline organization; career patterns; attitudes and values)

Examines the conflict between aspirations of professionally trained engineers and existing career paths in industry. The "dual ladder" system for promotion along managerial or professional tracks, is discussed. A survey of employees at one company provide data for an analysis that suggests the professional ladder is "used as a means of providing an alternative definition of success . . . but has not provided the status and money of 'equivalent' managerial positions because it does not provide authority to influence policy decisions.

Engr 11

Kessler, M. M. "Technical Information Flow Patterns," MIT Lincoln Laboratory, 1961. Proceedings Western Joint Computer Conference, 1961, 147-57.

(information exchange; structure of literature; national comparisons)

"References in the January 1957 Physical Review are the data base in this study of communication flow. The geographic distribution of references indicates American dominance and reliance on English language. Only 1.4% of the references were to Soviet journals. A similar study is performed on the June and October 1957 issues of the Soviet Journal of Theoretical & Experimental Physics. While citing Soviet Journals most frequently, it also relies heavily on the Physical Review and other American and British Journals. Similar counts were made on Nuovo Coment and on

Physica, an Italian and a Dutch journal. A composite picture of information flow along the East-West political axis is tabulated, and extended to applied physics journals (Journal of Applied Physics and IRE), which rely even less on foreign sources. A net flow of information from basic to applied journals is observed. A single issue of the proceedings of the IRE (June 1958) was devoted to transistor technology, and provides the references for a final study. Average issues of IRE may refer to Physical Review approximately 7.3% of the time, but in the new field of transistor technolgy, 25.2% of the references were to this basic physics journal (although overwhelmingly to authors based in industry which represent only 9% of the total authors in Physical Review). This reveals an intermediate group of scientists who form a bridge between basic and applied physics." (From Citation Analysis: An Annotated Bibliography, S. Cozzens, et. al. Philadelphia: Institute for Scientific Information, May, 1978.)

Engr 12

Ladenson, Robert F. et al. A Selected Annotated Bibliography of Professional Ethics and Social Responsibility in Engineering. Chicago: Center for the Study of Ethics in the Professions, 1980.

(attitudes and values)

Bibliography contains over 500 entries dealing with professional ethics and social responsibility in engineering. Includes extensive appendices on relevant general materials, including historical, sociological and psychological studies of engineers; conference proceedings and publications; bibliographies and resource directories.

Engr 13

Lufkin, J. M. and Miller, E. H. "The Reading Habits of Engineers--A Preliminary Survey," IEEE Transactions on Education, E-9 (December, 1966), 179-82.

(information exchange)

Discussion of continuing education for engineers includes a survey of the reading habits of 1765 aerospace and avionics engineers. There is a difference in the degree of usage of four information sources: about two thirds of those surveyed read technical magazines, one half read review journals and professional society journals, and one fourth read technical reports issued by firms or agencies. Certain groups of engineers (supervisors, authors of publications and symposium papers, engineers with advanced degrees) read much more than do engineers in general.

Engr 14

Marcson, Simon. "Role Concept of Engineering Managers," Institute of Radio Engineers, Transactions of the Professional Group on Engineering Management, EM-7 (March, 1960), 30-33.

(discipline organization; career patterns)

Surveys 616 engineering managers in a company with several national plants. At different levels of management, engineers have different orientations: at high levels, they identify with corporate concerns; at lower levels there is a strong professional, rather than business, orientation. Engineer-managers at lower levels tend to deal with subordinates in terms of "colleague" rather than "executive" authority. They feel excluded from decision making, and believe that technical, engineering work has no effect on policy. The company has not recognized that the promotion from engineer to manager requires new skills for a new role.

Engr 15

Marquis, Donald G. and Allen, Thomas J. "Communication Patterns in Applied Technology," American Psychologist, 21 (1966), 1052-60.

(information exchange)

Compares patterns of information flow in basic research and applied technology. Study of 17 engineering development projects and 2 physics basic research projects finds that "the communication patterns in the two areas of activity are not only largely independent of one another, but are qualitatively different in their nature." Analysis of sources and channels of communication finds little evidence of direct flow of information from science to technology.

Engr 16

McAllister, Paul R.; Anderson, Richard C. and Narin, Francis. "Comparison of Peer and Citation Assessment of the Influence of Scientific Journals," Journal of the American Society for Information Science, (May, 1980), 147-52.

(structure of literature--journal influence; discipline comparisons)

for annotation see Biol 15.

Engr 17

Perrucci, Robert. "Engineering: Professional Servant of Power," American Behavioral Scientist, 14 (March/April, 1974), 475-91.

(education; career patterns; professional associations; attitudes and values)

Essay discusses factors that inhibit the organization of engineering into a profession with sufficient power to shape its own activities. Examines specialization and fragmentation of education, careers, and professional associations. Suggests that origins and mobility experiences of engineers reinforce business rather than professional values.

Engr 18

Perrucci, Robert and Gerstl, Joel E. (eds.) The Engineers and the Social System. New York: John Wiley and Sons, 1969.

(discipline organization; career patterns; attitudes and values)

Collection of papers focused on social aspects of the engineering profession, including: "the historical and occupational setting of the profession, the processes of recruitment and socialization, the nature of work roles and organizations, and the links between careers and society." An introduction reviews the growth of the profession, gives an overview of each of the four sections, and discusses statistics on education, employment, publications, patents and professional societies.

Engr 19

Pfeffer, Jeffrey; Salancik, Gerald R. and Moore, William L. "Archival Indictors of Paradigm Development of Academic Disciplines," unpublished paper, School of Business Administration, University of California, Berkeley (first author), March, 1979.

(paradigm characteristics; graduate education; discipline comparisons)

for annotation see Biol 25

Engr 20

Rudoff, Alvin and Lucken, Dorothy. "The Engineer and His Work: A Sociological Perspective," Science, 172 (June 11, 1971), 1103-08.

(career patterns)

A secondary analysis of data obtained from over 1000 engineers (originally surveyed to determine their reactions to unemployment during a period of widespread layoffs). Examines professionalization, specialization, and mobility of engineers; compares defense versus non-defense employment. Includes some background on education and career choice.

Engr 21

Shepard, Herbert A. "Engineers as Marginal Men," Journal of Engineering Education, 47 (March, 1957), 536-42.

(attitudes and values; discipline organization)

Essay discusses the engineer as a "marginal man," whose profession falls between the scientific culture and the business culture. Examines the differences in values and time perspective of those two cultures, and discusses the engineer's social role as a translator of scientific knowledge into equipment for social use.

Engr 22

Shepard, Herbert A. "Social Change in Science and Engineering," IRE Transactions on Engineering and Management. (March, 1961), 11-14.

(attitudes and values; discipline organization)

Essay examines the changing boundaries of the engineering profession. Traditional functional differences between science and engineering are being diluted as scientists and engineers work together in research and development labs, but some differences in personal and social characteristics can still be observed. Engineers have accepted the bureaucratic and hierarchical structure of organizations: engineering as a social movement is seen to be in "the mature administrative phase," in which it is not unusual for engineers to hold executive positions in government and industry. The author suggests that science has not been integrated with society's major institutions in the same way, since traditional values in science and business are sometimes in conflict. A tendency toward internationalism in science is less prominent among engineers.

Engr 23

Smith, Bruce L. R. and Karlesky, Joseph J. The State of Academic Science: The Universities in the Nation's Research Effort. New York: Change Magazine Press, 1977.

(graduate education; funding of research; discipline comparisons)

for annotation see Biol 27

Engr 24

Trow,Martin. "Some Implications of the Social Origins of Engineers," paper presented at the annual meetings of the American Association for the Advancement of Science, December, 1968.

(attitudes and values; education; career patterns)

Study of engineering students examines their backgrounds, and the ways in which they are recruited and trained. Suggests that "certain social characteristics of engineers--specifically their social origins and mobility patterns--affect their perceptions and choice of profession, their orientation to the professional training, and their creativity in post-college careers." Data suggest that engineering students come from lower economic strata than undergraduates in other major fields. Engineering appears to be an attainable profession (as science may not), and is seen as an opportunity for upward mobility. This orientation contributes to a preference for professional rather than cultural emphasis in their training, and to a concern for technical mastery. The author discusses the implications of these findings for secondary level and college education.

Engr 25

Waldhart, T. J. "Utility of Scientific Research; The Engineer's Use of the Products of Science," IEEE Transactions on Professional Communcation PC-17 (2), (1974), 33-35.

(information exchange; structure of literature)

"In an attempt to explore the relationship of science to techology, Waldhart measures the utility of scientific research to a group of publishing engineers. The proportion of scientific papers referenced in 378 engineering papers (from the Engineering Index Annual 1970), is evidence that literature oriented engineers have stronger science awareness than 'average' engineers are thought to have. 62.6% of references in the papers were to scientific articles, whereas only 32% of the source papers were themselves scientific as opposed to engineering." (From Citation Analysis: An Annotated Bibliography, S. Cozzens, et al. Philadelphia: Institute for Scientific Information, May, 1978.)

Engr 26

Yermish, Ira and Drory, Alisa. "Characteristics of Highly Cited Papers in the Engineering Sciences," report on NSF Contract C-795. Philadelphia: Institute for Scientific Information, 1976.

(structure of literature)

Analysis of literature in engineering journals covered by the Science Citation Index identifies highly cited publications and the journals that carry them. An examination of the papers identifies communication and electronics as the most active areas of research, with industrial research pre-eminent. A tabulation of items cited ten or more times in 1973 shows that books rather than articles dominate the top of the list--in this respect engineering is quite different from more basic sciences. A small number of engineers are surveyed to give subjective ratings on the quality of the papers and their publishing journals, and on the contributions of the papers to their fields. These ratings do not show clear, significant correlations with citation rates. Clusters of highly cited, inter-related articles provide maps of important engineering specialties.

MATHEMATICS

Math 1

Allison, Paul D. and Stewart, John A. "Productivity Differences Among Scientists: Evidence for Accumulative Advantage" American Sociological Review, 39 (August, 1974), 596-606.

(productivity--age; discipline comparisons)

for annotation see Biol 1

Math 2

Anderson, Richard C.; Narin, Francis and McAllister, Paul. "Publication Ratings versus Peer Ratings of Universities," Journal of the American Society for Information Science, 29 (March, 1978), 91-103.

(university ratings; discipline comparisons)

for annotation see Biol 2

Math 3

Ben-David, Joseph. "The Universities and the Growth of Science," Minerva, 7 (Autumn/Winter, 1969), 1-35.

(development of disciplines and specialties; national comparisons)

Includes a section on "The Growth of New Disciplines: Statistics as a Case in Point." Compares development of statistics as a separate discipline in Germany, the United States and Britain. Factors include the converging interests of a number of sciences in statistical method, and a growing sense among statisticians in different fields of practicing a common and distinct discipline. In the U. S., establishment of statistics departments (tied in the beginning to needs of agricultural research) led to a growth in theoretical work which helped to define the discipline.

Math 4

Breneman, David W. "Effects of Recent Trends in Graduate Education in University Research Capability in Physics, Chemistry and Mathematics," in The State of Academic Science: Background Papers, Bruce L. R. Smith and Joseph J. Karlesky (eds.) New York: Change Magazine Press, 1978.

(graduate education; funding of research; discipline comparisons)

for annotation see Chem 12

Math 5

Cole, Stephen. "Age and Scientific Performance," American Journal of Sociology, 84 (January, 1979), 958-77.

(productivity--age; paradigm characteristics; discipline comparisons)

for annotation see Chem 15

Math 6

Cole, Stephen; Cole, Jonathan and Dietrich, Lorraine. "Measuring the Cognitive State of Scientific Disciplines," in Toward a Metric of Science, Y. Elkana, et al. (eds.) New York: John Wiley and Sons, 1978.

(paradigm characteristics; discipline comparisons)

for annotation see Bioc 5

Math 7

Cole, Stephen; Rubin, Leonard and Cole, Jonathan R. Peer Review in the National Science Foundation: Phase One of a Study. Washington, D.C.: National Academy of Sciences, 1978.

(funding of research; discipline comparisons)

for annotation see Bioc

Math 8

Crane, Diana. Invisible Colleges: Diffusion of Knowledge in Scientific Communities. Chicago: University of Chicago Press, 1972.

(development of disciplines and specialties; information exchange; discipline comparisons)

for annotation see Socl 21

Math 9

Deutsch, Karl W.; Platt, John and Senghass, Dieter. "Conditions Favoring Major Advances in Social Science," Science, 171 (February 5, 1971), 450-59.

(discovery process; discipline comparisons)

for annotation see Econ 8

Math 10

Fisher, Charles S. "The Last Invariant Theorists," European Journal of Sociology, 8 (November, 1967), 216-44.

(development of disciplines and specialties; national comparisons)

Discusses, from a sociological perspective, the decline of the theory of invariants from a specialty that accounted for one-third of all algebra papers at the end of the 19th Century to a "dead subject" after 1940. Biographies of theorists in Great Britain, Germany and the U.S. provide information on several social variables: environment and conditions of work (university prestige, support of research, attitudes of colleagues, recruitment of students); degree of commitment to the theory; relationships with students. Although problems addressed by the theory still exist, the marginal commitment of most of its specialists, the failure to recruit and sustain students, and the ascendent interest in modern algebra contributed to the disappearance of the specialty.

Math 11

Fisher, Charles S. "Some Social Characteristics of Mathematicians and their Work," American Journal of Sociology, 78 (March, 1973), 1094-1118.

(performance of research; career patterns)

Examines the experiences of a small number of mathematicians attempting to solve a long standing problem (the Poincare conjecture). Evidence suggests that the relevance and meaning of the problem depend on one's place in the mathematics community. The discipline of mathematics is characterized by conflicting elements: unity, based on a common course of study until the last years of graduate school; and "diffuseness," caused by the existence of three broad substantive areas (algebra, geometry, analysis), and by the independent function of individual mathematicians. These factors provide background for an examination of the effect of the selection of the Poincare conjecture problem on the careers of mathematicians who choose it, on their interpersonal behavior (patterns of association, competition, secrecy), and on "mathematics as a problem solving venture" (positive and negative aspects of intense committment to a problem).

Math 12

Frame, J. Davidson; Narin, Francis and Carpenter, Mark P. "The Distribution of World Science," Social Studies of Science, 7 (November, 1977), 501-16.

(structure of literature; national comparisons; discipline comparisons)

for annotation see Biol 5

Math 13

Friedlander, Frank. "Performance and Orientation Structure of Research Scientists," Organizational Behavior and Human Performance, 6 (March, 1971), 169-83.

(performance of research; discipline comparisons)

for annotation see Biol 6

Math 14

Griffith, Belver C. and Mullins, Nicholas C. "Coherent Social Groups in Scientific Change," Science, 177 (September 15, 1972), 959-64.

(development of disciplines and specialties; discipline comparisons)

for annotation see Bioc 8

Math 15

Hagstrom, Warren O. "Anomy in Scientific Communities," Social Problems, 12 (Fall, 1964), 186-95.

(performance of research; paradigm characteristics; recognition and reward; information exchange)

Examines the degree of social and intellectual solidarity in mathematics. Interviews with mathematicians provide information on "perceived size of typical audience (for research papers), frequency with which published papers are evaluated as 'trivial', frequency with which mathematicians are concerned about being anticipated in publishing their work, and the difficulties experienced in evaluating the importance of different specialties." Although there is consensus in mathematics with regard to fundamental propositions and criteria for evaluating validity, there is a breakdown in the exchange of information and in the recognition of contributions. The existence of independent, highly specialized areas of study means that a mathematician may have few colleagues to whom he can address information, and may not be aware of uses to which others put his work. The author suggests that mathematics has high "mechanical" solidarity but low "organic" solidarity.

Math 16

Hagstrom, Warren O. "Competition in Science," American Sociological Review, 39 (February, 1974), 1-18.

(competition; discipline comparisons)

for annotation see Biol 8

Math 17

Hagstrom, Warren O. "Factors Related to the Use of Different Modes of Publishing Research in Four Scientific Fields," in Communication Among Scientists and Engineers, Carnot E. Nelson and Donald K. Pollock (eds.) Lexington, Massachusetts: D. C. Heath and Company, 1970.

(information exchange; discipline comparisons)

for annotation see Biol 9

Math 18

Hagstrom, Warren O. "Forms of Scientific Teamwork," Administrative Science Quarterly, 9 (December, 1964), 241-63.

(performance of research; discipline comparisons)

for annotation see Biol 10

Math 19

Hagstrom, Warren O. "Inputs, Outputs, and the Prestige of American University Science Departments," Sociology of Education, 44 (Fall, 1971), 375-97.

(university ratings; discipline comparisons)

for annotation see Biol 11

Math 20

Hagstrom, Warren O. "The Production of Culture in Science," American Behavioral Science, 19 (July/August, 1976), 753-68.

(performance of research; paradigm characteristics; discipline comparisons)

for annotation see Biol 12

Math 21

Hagstrom, Warren O. The Scientific Community. New York: Basic Books, 1965.

(recognition and reward; competition; performance of research; discipline comparisons)

for annotation see Biol 13

Math 22

Halmos, Paul. "Nicolas Bourbaki," Scientific American, 196 (May, 1957), 88-99.

(performance of research)

Describes the activities of a fluid group of 10 to 20 French mathematicians which has published, since 1939, 20 volumes of a comprehensive treatise on mathematics under the pseudonym Nicolas Bourbaki. Discusses the style and spirit of the group, the process of their work (individual drafts reviewed and criticized at group meetings, many rewritings), and the unique features of Bourbaki publications (summaries, dictionaries of terminology and symbols, exercises).

Math 23

Hargens, Lowell L. Patterns of Scientific Research: A Comparative Analysis of Research in Three Scientific Fields. Washington, D.C.: The Arnold and Caroline Rose Monograph Series in Sociology, American Sociological Association, 1975.

(performance of research; paradigm characteristics; discipline comparisons) for annotations see Chem 31

Math 24

Hargens, Lowell L. "Relations Between Work Habits, Research Technologies, and Eminence in Science," Sociology of Work and Occupations, 5 (February, 1978), 97-112.

(performance of research; productivity; recognition and reward; discipline comparisons)

for annotation see Chem 32

Math 25

Kruytbosch, Carlos with Papenfuss, Susan. "Some Social and Organizational Characteristics of Breakthrough Science: An Analysis of Major Innovations in Four Fields of Science, 1950-1976," paper presented at the IX World Congress of Sociology, Uppsala, Sweden, August 17, 1978.

(discovery process; funding of research; discipline comparisons)

for annotation see Astr 6

Math 26

MacKenzie, Donald. "A Parex Workshop on the Sociology of Mathematics." Social Studies of Science, 8 (February, 1978), 141-42.

(performance of research; attitudes and values)

Report on four unpublished papers presented at a meeting sponsored by the Paris-Sussex group' for cooperative research in social studies of science. Issues discussed by authors are: (1) David Bloom: hypothesis about types of mathematical style that would be expected to be associated with different types of social structure. (2) Herbert Mehrtens: discussion of 'mathematic objectivity'. (3) Sabetai Unguru: study of mathematics of the past in its own terms. (4) Joan Richards: effect of William Kingdon Clifford's radical and empiricist attitudes on his geometric ideas.

Math 27

MacKenzie, Donald. "Statistical Theory and Social Interests: A Case Study," Social Studies of Science, 8 (February, 1978), 35-83.

(development of disciplines and specialties)

Discusses the influence of social and ideological issues on the development of the mathematical theory of statistics in Britain. Controversy over the measurement of statistical association is seen as a reflection of different goals and cognitive interests of two groups of statisticans: those committed to eugenics research and those with no special committments.

Math 28

May, Kenneth O. "Growth and Quality of Mathematical Literature," ISIS, 54 (Winter, 1968), 363-71.

(structure of literature)

Study of publications in the theory of determinants examines relationship between quantity and quality of published research. Over 1700 articles (published prior to 1920) are classified by six categories: new ideas and research; applications; systematization and history; texts; duplications; trivia. Separate curves plotted for each of the six categories over time suggest that the trivia category accounts for a large part of the overall exponential growth of literature on determinants. Texts, and publications containing significant new ideas, applications and systematizations make up less than one-third of the total literature. The author suggests that the use of cumulative growth curves disguises a wide range of quality and significance, and fails to reveal that overall growth is the result of uneven development of subtopics.

Math 29

McAllister, Paul R.; Anderson, Richard C. and Narin, Francis. "Comparison of Peer and Citation Assessment of the Influence of Scientific Journals," Journal of the American Society for Information Science, (May, 1980), 147-52.

(structure of literature--journal influence; discipline comparisons)

for annotation see Biol 15.

Math 30

Narin, Francis. Evaluative Bibliometrics: The Use of Citation Analysis in the Evaluation of Scientific Activity. New Jersey: Computer Horizons, Inc., 1976.

(structure of literature--journal influence; discipline comparisons)

for annotation see Biol 21

Math 31

Narin, F; Carpenter, M. P. and Berlt, N. C. "Inter-relationships of Scientific Journals," Journal of the American Society for Information Science, 23 (no. 5, 1972), 323-31.

(structure of literature; discipline comparisons)

for annotation see Biol 22

Math 32

Norton, Bernard J. "Karl Pearson and Statistics: The Social Origins of Scientific Innovation," Social Studies of Science, 8 (February, 1978), 3-34.

(development of disciplines and specialties)

Focuses on the contributions of Karl Pearson (1857-1936), whose work in mathematical biology influenced the development of the modern discipline of statistics. Examines how his philosophical and social views, in themselves a response to social and intellectual conditions of late-Victorian life, are related to "(i) his taking to biometry, (ii) biometry's power to yield developments in statistics, and (iii) the association of eugenics with statistics."

Math 33

Pfeffer, Jeffrey; Salancik, Gerald R. and Moore, William L. "Archival Indicators of Paradigm Development of Academic Disciplines," unpublished paper, School of Business Administration, University of California, Berkeley (first author), March, 1979.

(paradigm characteristics; graduate education; discipline comparisons)

for annotation see Biol 25

Math 34

Smith, Bruce L. R. and Karlesky, Joseph J. The State of Academic Science: The Universities in the Nation's Research Effort. New York: Change Magazine Press, 1977.

(graduate education; funding of research; discipline comparisons)

for annotation see Biol 27

Math 35

Stern, Nancy. "Age and Achievement in Mathematics: A Case Study in the Sociology of Science," Social Studies of Science, 8 (February, 1978), 127-40.

(productivity--age)

Difficulties unique to the sociological study of mathematics are analyzed, and justification is offered for the use of citation counts as a rough measure of quality of work in mathematics. Study concludes that no clear-cut relationship exists between age and productivity, or between age and quality of work in mathematics. It is suggested that limitations of statistical techniques in sociology of science might be balanced by attention to individual biographies.

Math 36

Storer, Norman. "Relations Among Scientific Disciplines," in The Social Contexts of Research, Saad Z. Nagi and Ronald G. Corwin (eds.) New York: Wiley Interscience, 1972.

(paradigm characteristics; recognition and reward; discipline comparisons)

for annotation see Biol 28

Math 37

Zuckerman, Harriet and Merton, Robert. "Age, Aging and Age Structure in Science," in The Sociology of Science, Robert K. Merton. Chicago: University of Chicago Press, 1973.

(productivity--age; paradigm characteristics; discipline comparisons)

for annotation see Biol 32

PHYSICS

Phys 1

Allison, Paul D. and Stewart, John A. "Productivity Differences Among Scientists: Evidence for Accumulative Advantage," American Sociological Review, 39 (August, 1974), 596-606.

(productivity--age; discipline comparisons)

for annotation see Biol 1

Phys 2

Anderson, Richard C.; Narin, Francis and McAllister, Paul. "Publication Ratings versus Peer Ratings of Universities," Journal of the American Society for Information Science, 29 (March, 1978), 91-103.

(university ratings; discipline comparisons)

for annotation see Biol 2

Phys 3

Bayer, Alan E. and Dutton, Jeffrey E. "Career Age and Research-Professional Activities of Academic Scientists," Journal of Higher Education, 48 (May/June 1977); 259-82.

(productivity--age; discipline comparisons)

for annotation see Bioc 1

Phys 4

Beyer, Janice M. "Editorial Policies and Practices Among Leading Journals in Four Scientific Fields," Sociological Quarterly, 19 (Winter, 1978), 66-88.

(paradigm characteristics; publication practices; discipline comparisons)

for annotation see Chem 5

Phys 5

Beyer, Janice M. and Lodahl, Thomas M. "A Comparative Study of Patterns of Influence in United States and English Universities," Administrative Science Quarterly, 21 (March, 1976), 104-29.

(discipline organization; paradigm characteristics; discipline comparisons; national comparisons)

for annotation see Chem 6

Phys 6

Beyer, Janice M. and Snipper, Reuben. "Objective Versus Subjective Indicators of Quality in Graduate Education," Sociology of Education, 47 (1974), 541-57.

(university ratings; paradigm characteristics; discipline comparisons)

for annotation see Chem 7

Phys 7

Beyer, Janice M. and Stevens, John M. "Differences Between Scientific Fields in Patterns of Research Activity and Productivity," paper number 195, State University of New York at Buffalo, School of Management, October, 1974.

(performance of research; paradigm characteristics; discipline comparisons)

for annotation see Chem 8

Phys 8

Beyer, Janice M. and Stevens, John M. "Factors Associated With Changes in Prestige of University Departments," Research in Higher Education, 7 (1977), 229-55.

(university ratings; discipline comparisons)

for annotation see Chem 9

Phys 9

Blau, Judith R. "Patterns of Communication Among Theoretical High Energy Physicists," Sociometry, (September, 1974), 391-406.

(information exchange; social stratification)

Secondary analysis of questionnaire data from an international sample of theoretical high energy physicists examines factors that influence patterns of association and information exchange. (Sample size: 977 physicists, who represent 35 to 45 percent of the world THEP population.) The author finds two distinct patterns of communication and interaction, which are reflections of two social systems and reward structures within the THEP community. On the specialty level, status and interaction are determined by research merit. On a wider level, less distiguished informal leaders (respected for their general knowledge of the discipline, personal integrity and leadership ability) "appear to play the major role in communication networks that cut across specialties and across status differences within specialties, and help integrate the scientific discipline."

Phys 10

Blau, Judith R. "Scientific Recognition: Academic Context and Professional Role," Social Studies of Science, 6 (September, 1976), 533-45.

(recognition and reward)

Discusses the influence of two factors--"the nature of university Physics Departments, and the extent of participation in various scientific roles"--on the recognition of theoretical high energy physicists at North American universities. The data analyzed are from a 1966-1967 survey of 363 specialists (94% of the American theoretical high energy physics community). Among the departmental characteristics considered are size, number of specialties, quality rating. Among the individual characteristics considered are professional age, mobility, relative emphasis on teaching and research, editorial or referee duties. Comparisons with international data suggest that the Matthew Effect (accumulative advantage) is more pronounced in the international than the national community of theoretical high energy physicists.

Phys 11

Blau, Judith R. "Scientometric Structure of a Scientific Discipline," in Research in Sociology of Knowledge, Sciences and Art, Robert A. Jones (ed.) Greenwich, Connecticut: JAI Press, Inc. 1978.

(information exchange; career patterns; discovery process; productivity--age)

"A sociometric analysis of the reported consultations of 411 U.S. theoretical high-energy physicists (more than 90 percent of the universe) makes it possible to devise three categories: (a) an invisible college of 111 physicists comprising a single network, (b) a periphery of 125 physicists who are members of separate clusters consisting of 2-18 members, and (c) 175 isolates who do not consult any colleagues outside their own institution. Members of the invisible college are younger and work in the newest, most dynamic specialties in theoretical high-energy physics. But they are less likely than physicists on the periphery of the communication network to occupy organizational positions of authority and influence. This suggests that physicists move in their careers from work in more innovative fields to that in less innovative fields, and from central positions in the informal communication structure to major positions in the formal organization of the field. The tentative conclusion is that the most creative contributions tend to be made by young physicists, not as the result of any special quality of young minds, but as the product of the social structure and the progress of a paradigmatic discipline." (Author's abstract.)

Phys 12

Breneman, David W. "Effects of Recent Trends in Graduate Education on University Research Capability in Physics, Chemistry and Mathematics," in The State of Academic Science: Background Papers, Bruce L. R. Smith and Joseph J. Karlesky (eds.) New York: Change Magazine Press, 1978, 133-62.

(graduate education; funding of research; discipline comparisons)

for annotation see Chem 12

Phys 13

Brush, Stephen. "Planetary Science: From Underground to Underdog," Scientia, 113 (Autumn, 1978), 771-87.

(development of disciplines and specialties; social stratification)

for annotation see E&Sp 3

Phys 14

Carpenter, M. P. and Narin, F. "Clustering of Scientific Journals," Journal of the American Society for Information Science, 24 (no. 6, 1973), 425-36.

(structure of literature--specialty groups; discipline comparisons)

for annotation see Bioc 3

Phys 15

Cartter, Allan M. An Assessment of Quality in Graduate Education. Washington, D. C.: American Council on Education, 1966.

(university ratings)

for annotation see Econ 4

Phys 16

Cawkell, A. E. "Search Strategy, Construction and Use of Citation Networks, With a Socio-Scientific Example: Amorphous Semi-Conductors and S. R. Ovshinsky," Journal of the American Society for Information Science, 25 (March/April, 1974), 124-30.

(structure of literature--specialty groups)

for annotation see Engr 4

Phys 17

Chubin, D. and Moitra, S. "Content Analysis of References: An Alternative to Citation Counting," Social Studies of Science, 5 (no. 4, 1975), 423-41.

(structure of literature)

"The authors take a closer look at the distribution of different kinds of citations (e.g. affirmative and negative citations) in different forms of articles (full-length or letters; theoretical or experimental), in high energy physics. The results address some of the problems raised by the use of raw citation counts." (From Citation Analysis: An Annotated Bibliography, S. Cozzens, et. al. Philadelphia: Institute for Scientific Information, May, 1978.)

Phys 18

Cole, Jonathan R. "Patterns of Intellectual Influence in Scientific Research," Sociology of Education, 43 (Fall, 1970), 377-403.

(social stratification; discovery process)

Discusses conflicting ideas about the work of eminent scientists: does it rest on the work of many, less distinguished, "invisible" scientists, or are a relatively few scientists responsible for scientific advance? Three sets of data are examined: 1) the use of research literature by a stratified sample of academic physicists (individual status determined by prestige of department, and by quality of work as measured by citations); 2) subjective evaluation of significant contributions in physics; 3) characteristics of a highly cited set of papers in The Physical Review. All of the data indicate that there is a "sharp stratification" in the use of work published by physicists of various status. Scientists located in the top strata of academic physics predominantly cite the work of others in the same strata. Members of lower strata disproportionately cite the work of members of the most distinguished departments. Physicists throughout the community cite the work of eminent scientists. The data suggest that a "relatively small number of scientists produce work that becomes the base for future discoveries."

Phys 19

Cole, Jonathan R. and Cole, Stephen. Social Stratification in Science. Chicago: University of Chicago Press, 1973.

(social stratification; recognition and reward; information exchange; discovery process)

Studies the "social structure of a scientific community" and examines how that structure influences scientific work. Focus is on academic physicists. Includes the following chapters: (1) "The Sociology of Science" reviews growth of the study of the social organization of science, and examines ways in which this organization affects scientific development. (2) "Measuring the Quality of Scientific Output" analyzes the adequacy of citation studies to measure the quality of scientific output. (3) "Patterns of Stratification in American Science" discusses status with reference to the normative structure, the reward system, and the role of authority in science. (4) "Location in the Stratification System and Scientific Output" examines how an individual's status is determined, and discusses status patterns of publications and rewards. (5) "Discrimination Against Women and Minorities in Science" examines influence of non-scientific status on evaluation (based on data from chemistry, biology and psychology.) (6) "Stratification and the Communication of Scientific Information" analyzes how the social structure influences the flow of information. (7) "Professional Standing and the Reception of Scientific Discoveries" examines how status affects reception of work. (8) "The Ortega Hypothesis" examines hypothesis that the work of eminent scientists depends upon the work of many "less eminent" scientists. Tentative conclusion rejects the hypothesis and suggests that a decline in the number of scientists may not slow down the rate of scientific progress. (9) "Universalism and Its Consequences in Science" summarizes major findings; discusses consequences for individuals in a system that approaches a "meritocracy."

Phys 20

Cole, Stephen, "Age and Scientific Performance," American Journal of Sociology, 84 (January, 1979), 958-77.

(productivity--age; paradigm characteristics; discipline comparisons)

for annotation see Chem 15

Phys 21

Cole, Stephen. "Professional Standing and the Reception of Scientific Discoveries," American Journal of Sociology, 76 (September, 1970), 286-306.

(social stratification; information exchange)

Study of publications in physics examines the influence of a scientist's status on the reception of his papers. Data suggest that the initial reception of papers of equal quality is not determined by the location of authors in the stratification system, although the speed of diffusion of papers of equal quality is influenced by the reputation of the author. Top papers by physicists of all ranks are equally widely diffused, although lower quality papers by high ranking physicists receive greater attention than papers of similar quality by low ranking physicists.

Phys 22

Cole, Stephen. "Scientific Reward Systems: A Comparative Analysis," in Research in Sociology of Knowledge, Sciences and Art. Robert A. Jones (ed.) Greenwich, Connecticut: JAI Press, Inc. 1978.

(recognition and reward; paradigm characteristics; discipline comparisons)

for annotation see Bioc 4

Phys 23

Cole, Stephen and Cole, Jonathan R. "Scientific Output and Recognition: A Study in the Operation of the Reward System in Science," American Sociological Review, 32 (June, 1967), 377-90.

(recognition and reward; productivity)

Study of the relationship between quality and quantity of the scientific output of 120 university physicists. Quality of output is found to be more significant than quantity in the receipt of awards and prestigious appointments. The reward system encourages creative scientists to be highly productive, and produces a higher correlation between quantity and quality of output in top physics departments than in weaker departments.

Phys 24

Cole, S. and Cole, J. R. "Visibility and the Structural Bases of Awareness of Scientific Research," American Sociological Review, 33 (no. 3, 1968), 397-413.

(recognition and reward)

"Discusses the correlation between measures of the 'visibility' of university physicists and other characteristics: quality of their output (age-weighted citations to three best years), rank of department, prestige of highest award, specialty, age, and name order in collaborative works. The inverse of 'visibility' (the degree to which a physicist is known to others) is 'awareness' (the degree to which a physicist knows others). Awareness is correlated with the same set of characteristics. The study indicates that the characteristics which make for high awareness do not make for high visibility." (From Citation Analysis: An Annotated Bibliography, S. Cozzens, et. al. Philadelphia: Institute for Scientific Information, May, 1978.)

Phys 25

Cole, Stephen; Cole, Jonathan and Dietrich, Lorraine. "Measuring the Cognitive State of Scientific Disciplines," in Toward a Metric of Science, Y. Elkana, et al. (eds.) New York: John Wiley and Sons, 1978.

(paradigm characteristics; discipline comparisons)

for annotation see Bioc 5

Phys 26

Cole, Stephen; Rubin, Leonard and Cole, Jonathan R. Peer Review in the National Science Foundation: Phase One of a Study. Washington, D.C.: National Academy of Science, 1978.

(funding of research; discipline comparisons)

for annotation see Bioc 6

Phys 27

Collins, H. M. "The TEA Set: Tacit Knowledge and Scientific Networks," Science Studies, 4 (April, 1974), 165-85.

(information exchange; competition)

Study of the diffusion of knowledge among experimental physicists building TEA (high pressure gas) lasers. Seven British and five North American laboratories (including government, industry and university labs) are the focus of the study. The study finds that physicists actually learned to build working models of the laser by contact with a source laboratory, either through personal visits, telephone calls or transfer of personnel. Literature did not play a significant role, since it is not an effective transmitter of "tacit knowledge." Elements of secrecy and competition are discussed. The author suggests that sociological methods must acknowledge importance of "all the elements and uses of scientific knowledge, not only the formal and informal elements, but the political, persuasive, and emotive, and even the intangible and unspeakable."

Phys 28

Elton, Charles F. and Rodgers, Samuel A. "Physics Department Ratings: Another Evaluation," Science, 174 (November 5, 1971), 565-68.

(university ratings)

Rates physics departments by combining six variables: number of areas of specialization within a department, number of faculty, number of Ph.D.'s awarded 1960-64, number of full time students, number of first year students, and ratio of part-time to full time students. Authors finds that their ratings, based on public, objective data, correspond closely to ratings obtained through major subjective surveys by the American Council on Education (Allan Cartter, 1966; Roose and Anderson, 1970).

Phys 29

Frame, J. Davidson and Baum, John J. "Cross-National Information Flows in Basic Research: Examples Taken from Physics," Journal of the American Society for Information Science, 29 (September, 1978), 247-52.

(information exchange; national comparisons)

International information exchange patterns are examined in three subfields: plasma physics, magnetohydrodynamic (MHD) power generation, and superconductivity. Citation analysis shows U. S. work in all three areas to be the most heavily referenced, with foreign scientists citing U. S. work more frequently than U. S. scientists cite foreign work. Cultural and linguistic factors that influence citation patterns are discussed, and policy implications of a "referencing gap" are raised.

Phys 30

Frame, J. Davidson; Narin, Francis and Carpenter, Mark P. "The Distribution of World Science," Social Studies of Science, 7 (November, 1977), 501-16.

(structure of literature; national comparisons; discipline comparisons)

for annotation see Biol 5

Phys 31

Friedlander, Frank. "Performance and Orientation Structure of Research Scientists," Organizational Behavior and Human Performance, 6 (March, 1971), 169-83.

(performance of research; discipline comparisons)

for annotation see Biol 6

Phys 32

Garfield, Eugene; Malin, Morton V. and Small, Henry. "Citation Data as Science Indicators," in Toward A Metric of Science, Y. Elkana et al. (eds.) New York: John Wiley and Sons, 1978.

(structure of literature--specialty groups; discipline comparisons)

for annotation see Biom 8

Phys 33

Gaston, Jerry. Originality and Competiton in Science: A Study of the British High Energy Physics Community. Chicago and London: University of Chicago Press, 1973

(competition; recognition and reward; national comparisons)

Interviews with 203 British high energy physicists provide information on the issue of originality in science, on the importance of recognition in a scientist's career, and on competition for priority in discovery. The data illustrate a dilemma of the scientific community: norms that "prescribe acceptable ways for researchers, as scientists, to act," do not account for the requirements of career advancement. Among the scientists studied, theorists and experimentalists form two identifiable groups, which are different in their organization of research, patterns of communication, degrees of competition.

Phys 34

Gaston, Jerry. "The Reward System in British Science," American Sociological Review, 35 (August, 1970), 718-32.

(recognition and reward; performance of research; national comparisons)

Study of British high energy physicists at 20 universities and 3 research establishments concludes that more recognition goes to theoretical scientists than to experimental scientists, independent of social factors that seem to operate in the American physics community (prestige of institutions and departments). Suggests that future research should consider various degrees of division of labor in science.

Phys 35

Gaston, Jerry. The Reward System in British and American Science. New York: John Wiley and Sons, 1978.

(recognition and reward; paradigm characteristics; discipline comparisons; national comparisons)

for annotation see Biol 7

Phys 36

Gaston, Jerry. "Secretiveness and Competition for Priority of Discovery in Physics," Minerva, 9 (October, 1971), 472-92.

(competition; national comparisons)

Study of the field of high energy physics in Britain. Agreement on identification of important problems has created strong competiton for priority of discovery and publication. Includes data (obtained from interviews with 203 physicists) on disputed priority; prevalance and severity of competition; responses to having research anticipated; suspicion of theft; secretiveness (witholding information) and reticence (concern for meeting scientific standards).

(British physicsts J. C. Polkinghorne responds to this article, "Correspondence," Minerva, 10 (April, 1972). Argues that free discussion and exchange of ideas, and honest attempts to give credit where credit is due, outweigh the "jungle element" of competition. Cites especially the practice of sending pre-publication prints as a method of establishing priority while spreading information to world physics centers.)

Phys 37

Gibbons, Michael. "The CERN 300 GeV Accelerator: A Case Study in the Application of the Weinberg Criteria," Minerva, 8 (April, 1970), 181-91.

(funding of research)

Uses Alan Weinberg's criteria of scientific, technological and social merit to anlayze decision to fund the CERN accelerator. Suggests that Weinberg's criteria may be a "first approximation" to a model for decison making in science policy, and outlines areas where further development of criteria is needed.

Phys 38

Gibbons, Michael and King, Philip. "The Development of Ovonic Switches: A Case Study of Scientific Controversy," Science Studies, 2 (October, 1972), 295.

(recognition and reward; attitudes and values)

for annotation see Engr 9

Phys 39

Griffith, Belver C. and Mullins, Nicholas C. "Coherent Social Groups in Scientific Change," Science, 177 (September 15, 1972), 959-64.

(development of disciplines and specialties, discipline comparisons)

for annotation see Bioc 8

Phys 40

Hagstrom, Warren O. "Competition in Science," American Sociological Review, 39 (February, 1974), 1-18.

(competition; discipline comparisons)

for annotation see Biol 8

Phys 41

Hagstrom, Warren O. "Factors Related to the Use of Different Modes of Publishing Research in Four Scientific Fields," in Communication Among Scientists and Engineers, Carnot E. Nelson and Donald K. Pollock (eds.) Lexington, Massachusetts: D. C. Heath and Company, 1970.

(information exchange; discipline comparisons)

for annotation see Biol 9

Phys 42

Hagstrom, Warren O. "Forms of Scientific Teamwork," Administrative Science Quarterly, 9 (December, 1964), 241-63.

(performance of research; discipline comparisons)

for annotation see Biol 10

Phys 43

Hagstrom, Warren O. "Inputs, Outputs, and the Prestige of American University Science Departments," Sociology of Education, 44 (Fall, 1971), 375-97.

(university ratings; discipline comparisons)

for annotation see Biol 11

Phys 44

Hagstrom, Warren O. "The Production of Culture in Science," American Behavioral Science, 19 (July/August, 1976), 753-68.

(performance of research; paradigm characteristics; discipline comparisons)

for annotation see Biol 12

Phys 45

Hagstrom, Warren O. The Scientific Community. New York: Basic Books, 1965.

(recognition and reward; competition; performance of research; discipline comparisons)

for annotation see Biol 13

Phys 46

Herschman, Arthur. "A Program for a National Information System for Physics," in Communication Among Scientists and Engineers, Carnot E. Nelson and Donald K. Pollock (eds.) Lexington, Massachusetts: D. C. Heath and Company, 1970.

(information exchange; professional associations)

Reviews American Institute of Physics effort to develop a National Information System for Physics. Discusses employment patterns and work activities of the physics community, the role of the AIP, and problems created by the size and growth of information in physics. Different kinds of information in physics are identified, and the preference of physicists for various information channels are outlined. Plans for the system include an "awareness journal" of current titles in physics, machine searchable physics information notices, specialized bibliographies, and, eventually, centralized information facilities linked to other institutions and to similar facilities in related disciplines. These plans give a "user orientation" to an information system that has been producer oriented.

Phys 47

Inhaber, H. "Is There a Pecking Order in Physics Journals?" Physics Today, 27 (May, 1974), 39-43.

(structure of literature--journal influence)

Analysis of almost one million citations from physics articles provides data for the examination of the prestige and influence of physics journals. Three types of rankings are provided. Rankings based on the number of citations received by a journal, rankings based on "impact" (rankings adjusted to the size and frequency of a publication), and rankings based on "immediacy" (adjusted for how soon articles become cited).

Phys 48

Inhaber, H. and Przednowek, K. "Quality of Research and the Nobel Prizes," Social Studies of Science, 6 (1976), 33-50.

(recognition and reward; structure of literature--citation rates; discipline comparisons)

for annotation see Biom 12

Phys 49

Kessler, M. M. "Technical Information Flow Patterns," MIT Lincoln Laboratory, 1961. Proceedings Western Joint Computer Conference, 1961, 147-57

(information exchange; structure of literature; national comparisons)

for annotation see Engr 11

Phys 50

Kevles, Daniel J. The Physicists. New York: Alfred A. Knopf, 1979.

(development of disciplines and specialties; attitudes and values)

History of American physicists, from post civil war years to the present, deals with "two broad topical strands. The first is American physicists in their own right; the second is the general world of the sciences, especially the physical sciences, in the United States." Among the facets explored are "opportunities and institutions, responsibilities and attitudes, . . . power, status and expectations."

Phys 51

Libbey, Miles A. and Zaltman, Gerald. The Role and Distribution of Written Informal Communication in Theoretical High Energy Physics. New York: American Institute of Physics, 1967.

(information exchange)

A study of preprint distribution in theoretical high energy physics conducted by the American Institute of Physics. The study is based on interviews with 45 high energy physicists, and surveys of two populations: all known high energy physicists and a sample of preprint librarians in the U.S. and abroad. Data are analyzed to determine existing networks, patterns of information flow, and attitudes of THEP community toward a proposed centralized preprint distribution. A design is proposed for an experiment in central distribution.

Phys 52

Lin, Nan and Nelson, Carnot E. "Bibliographic Reference Patterns in Core Sociological Journals, 1965-1966," American Sociologist, 4 (February, 1969), 47-50.

(structure of literature--journal influence; discipline comparisons)

for annotation see Socl 32

Phys 53

Lodahl, Janice Beyer and Gordon, Gerald. "Differences Between Physical and Social Sciences in University Graduate Departments," Research in Higher Education, 1 (1973), 191-213.

(paradigm characteristics; discipline organization; discipline comparisons)

for annotation see Chem 38

Phys 54

Lodahl, Janice Beyer and Gordon, Gerald. "Funding the Sciences in University Departments," Educational Record, 54 (no. 1, 1973), 74-82.

(funding of research; paradigm characteristics; university ratings; discipline comparisons)

for annotation see Chem 39

Phys 55

Lodahl, Janice Beyer and Gordon, Gerald. "The Structure of Scientific Fields and the Functioning of University Graduate Departments," American Sociological Review, 32 (February, 1972), 57-72.

(paradigm characteristics; graduate education; performance of research; discipline comparisons)

for annotation see Chem 40

Phys 56

Marcson, Simon. "Decision Making in a University Physics Department," American Behavioral Scientist, (December, 1962), 37-39.

(discipline organization)

Examines the organization, management, and authority structure of the physics department at an unnamed (famous) university, and discusses how they affect the work environment. Emphasis is on "colleague authority" (authority shared by all members), but this authority is modified by the hierarchy of professorial ranks, and by the role of the department chairman. Decision making is diffused by the major organizational mechanism of committees. The article includes comparisons with the organization of scientific work in industry.

Phys 57

Marquis, Donald G. and Allen, Thomas J. "Communication Patterns in Applied Technology," American Psychologist, 21 (1966), 1052-60.

(information exchange)

for annotation see Engr 15

Phys 58

McAllister, Paul R.; Anderson, Richard C. and Narin, Francis. "Comparison of Peer and Citation Assessment of the Influence of Scientific Journals," Journal of the American Society for Information Science, (May, 1980), 147-52.

(structure of literature--journal influence; discipline comparisons)

for annotation see Biol 15

Phys 59

McGinnis, Robert and Long, J. Scott. "The Enduring Effects of Ph.D. Origin: Early Careers of Four Cohorts of Scientists," paper presented at International Symposium on Quantitative Methods in the History of Science, Berkeley, California, August 25-27, 1976.

(graduate education; career patterns; discipline comparisons)

for annotation see Bioc 17

Phys 60

McGinnis, Robert and Singh, Vijai P. "Three Types of Mobility and their CoVariation Among Physicists," unpublished paper, Cornell University, Social Analysis of Science Systems, 1972 (?).

(career patterns)

Studies 3400 physicists over a six year period (1960-66) in order to examine mobility patterns. Factors considered are professional age, geographic location, type of employer, and subfield of specialty. Differences in size, growth and retention rates for subfields of physics are discussed. Data suggest that physicists are "quite mobile" in terms of geographic location, type of employment and change of subfield, but there are complex interactions among these three dimensions of mobility, which vary with professional age.

Phys 61

Moravcsik, M. J. and Murugesan, P. "Some Results on the Function and Quality of Citations," Social Studies of Science, 5 (1975), 86-92.

(structure of literature)

"706 references from 30 theoretical high-energy physics articles from the Physical Review (1968-1972) are categorized as: conceptual or operational, organic or perfunctory, evolutionary or juxtapositional, and confirmative or negational. The number of redundant citations was also measured (33%). Percentages in each category indicate a high degree of duplication of research, and the existence of variable approaches to the same question. Moravcsik suggests an evolutionary-to-juxtapositional citation ratio as a quantitative measure of the momentary success of a given field. The large number of perfunctory citations (41%) raises serious doubts about the use of citation as a quality measure. Negative citations were 14% of the total." (From Citation Analysis: An Annotated Bibliography, S. Cozzens, et. al. Philadelphia: Institute for Scientific Information, May, 1978.)

Phys 62

Moseley, Russell. "Tadpoles and Frogs: Some Aspects of the Professionalization of British Physics, 1870-1939," Social Studies of Science, 7 (November, 1977), 423-46.

(social stratification; discipline organization; career patterns; professional associations)

Examines the emergence of physics as a profession in Great Britain and discusses the importance of rank and file physicists in the movement toward creation of a professional institution. Suggests that explanations of professionalization should consider the existence of a hierarchy within the physics community and should trace the effect of tensions between the elite and the rank and file on the form of institutional structure adopted by the profession.

Phys 63

Mulkay, Michael and Williams, Anthony T. "A Sociological Study of a Physics Department," British Journal of Sociology, 22 (1971), 68-82.

(recognition and reward; discipline organization; education; funding of research)

Study of a physics department at a Canadian university examines "the manner in which the reward system of the scientific profession structures activities within the department." Interviews with 15 of the 16 physicists in the department provide information on several aspects of professional objectives and incentives: the role of research publication in professional recognition, government science policy, attitudes toward teaching, departmental administrative structure.

Phys 64

Murugesan, P. and Moravcsik, M. J. "Variation of the Nature of Citation Measures with Journals and Scienctific Specialties," Journal of the American Society for Information Science, (May, 1978), 141-47.

(structure of literature)

Examines and classifies by function over three thousand references from a random sample of two hundred thirty articles in theoretical physics. The articles are drawn from journals in four geographic areas--U.S. (1 journal), Europe (1), Japan (1) and the Soviet Union (3). Specialty and geographic variations found include different types of references, and different numbers of references per article. The state of the specialty, and the degree of development of communication and information exchange may explain the differences observed.

Phys 65

Nadel, Edward. "Multivariate Citation Analysis and the Changing Cognitive Organization in a Discipline of Physics," unpublished paper. Institute for Scientific Information, November, 1978.

(structure of literature; discovery process; paradigm characteristics)

Case study of superconductivity compares an historial reconstruction of the sequence of events (1930-64) to "cognitive organization strategies" that use citation analysis to explore relationships between events (publications). The question asked is: "Does the cognitive organization of the discipline change in historical periods that lack the introduction of any important work?" The statistical studies seem to illustrate characteristics not thoroughly explained by the traditional intellectual reconstructions. Historical "delays in recognition" of new ideas are seen, through analysis of use of the literature, to be a process of systematic cognitive reorganization, with growing consensus about the importance or utility of new ideas. Such reorganizations occur in all the periods examined, not only during periods in which new ideas are introduced, indicating that assessment and reassessment processes are continuously at work.

Phys 66

Narin, Francis. *Evaluative Bibliometrics: The Use of Citation Analysis in the Evaluation of Scientific Activity*. New Jersey: Computer Horizons, Inc., 1976.

(structure of literature--journal influence; discipline comparisons)

for annotation see Biol 21

Phys 67

Narin, F.; Carpenter, M. P. and Berlt, N. C. "Inter-relationships of Scientific Journals," *Journal of the American Society for Information Science*, 23 (no. 5, 1972), 323-31.

(structure of literature; discipline comparisons)

for annotation see Biol 22

Phys 68

Neumann, Yoram. "Predicting Faculty Success in University Graduate Departments," *Research in Higher Education*, 6 (1977), 275-87.

(recognition and reward; paradigm characteristics; discipline comparisons)

for annotation see Chem 44

Phys 69

Neumann, Yoram. "Predictors of Funding in Academic Fields," *Research in Higher Education*, 9 (1978), 115-22.

(funding of research; paradigm characteristics; discipline comparisons)

for annotation see Chem 45

Phys 70

Neumann, Yoram and Boris, Steven Barnet. "Paradigm Development and Leadership Style of University Department Chairpersons," *Research in Higher Education*, 9 (1978), 291-302.

(paradigm characteristics; discipline organization)

for annotation see Chem 46

Phys 71

Pfeffer, Jeffrey; Salancik, Gerald R. and Moore, William L. "Archival Indicators of Paradigm Development of Academic Disciplines," unpublished paper, School of Business Administration, University of California, Berkeley (first author), March, 1979.

(paradigm characteristics; graduate education; discipline comparisons)

for annotation see Biol 25

Phys 72

Reif, F. "The Competitive World of the Pure Scientist," Science, 134 (December 15, 1961), 1957-62.

(competition)

An essay on competition in physics, by a professor of physics. Discusses how the importance of prestige as a measure of success leads to pressure to publish notes quickly, in order to establish priority claims. Examines some conflicts that arise in scientific work becuuse of competitive pressure: reflection vs. production, careful vs. fast work, communication vs. secrecy, research vs. teaching. Includes brief example of the development of atomic clocks.

Phys 73

Roe, Anne. The Making of A Scientist. New York: Dodd, Mead and Company, 1952.

(discovery process; discipline comparisons)

for annotation see Biol 26

Phys 74

Shearer, E. and Moravcsik, M. J. "Citation Patterns in Little Science and Big Science," Scientometrics, 1 (August, 1979), 463-74

(structure of literature)

Compares articles in theoretical physics from the years 1935 and 1955 in order to determine differences in the citation characteristics of the literature of big and little science. Analysis of the literature in Zeitschrift fur Physik and The Physical Review finds only one significant difference over the time period studied: an increase in the number of references per article. Additional study of literature in The Physical Review for 1968 shows a continuation of the trend. The content of cited literature in the German journal is different from that in the American journal, an unexpected pattern which is consistent over the time period studied.

Phys 75

Small, H. G. and Crane, D. "Specialties and Disciplines in Science and Social Science: An Examination of their Structure Using Citation Indexes," Scientometrics, I (August, 1979), 445-61.

(structure of literature; discipline comparisons)

for annotation see Econ 21

Phys 76

Small, Henry and Griffith, Belver C. "The Structure of Scientific Literatures I: Identifying and Graphing Specialties," Science Studies, 4 (November, 1974), 17-40.

(structure of literature--specialty groups; discipline comparisons)

for annotation see Biom 18

Phys 77

Smith, Bruce L. R. and Karlesky, Joseph J. The State of Academic Science: The Universities in the Nation's Research Effort. New York: Change Magazine Press, 1977.

(graduate education; funding of research; discipline comparisons)

for annotation see Biol 27

Phys 78

Storer, Norman. "Relations Among Scientific Disciplines," in The Social Contexts of Research, Saad Z. Nagi and Ronald G. Corwin (eds.) New York: Wiley Interscience, 1972.

(paradigm characteristics; recognition and reward; discipline comparisons)

for annotation see Biol 28

Phys 79

Sullivan, Daniel; White, D. Hywel and Barboni, Edward J. "Co-Citation Analysis of Science: An Evaluation," Social Studies of Science, 7 (May, 1977), 223-40.

(structure of literature--specialty groups)

Examines three claims made for the technique for co-citation analysis: (I) that co-citation clusters reflect the cognitive structures of research specialties (2) that the current population of publishing specialists is the group of citing authors for the clusters and (3) that by using the same thresholds each year the growth of the specialty can be gauged in terms of the growth of the clusters. The authors' study of a specialty in elementary particle physics, which compares citation data to an intellectual history of the specialty, provides support only for the first claim. Suggestion is made that co-citation analysis is a supplement to, but not a substitute for, other techniques for analysis of scientific specialties.

Phys 80

Sullivan, Daniel; White, D. Hywel and Barboni, Edward J. "The State of a Science: Indicators in the Specialty of Weak Interactions," Social Studies of Science, 7 (May, 1977), 167-200.

(structure of literature--specialty groups; productivity)

Analyzes over 4500 articles on the physics of weak interactions published during the period 1950-1972. Comparison of the publications of theoretical and experimental physicists identifies different patterns of article production for the two groups, but finds similar referencing and demographic (movement of scientists between research areas) patterns. The complexity of experimental research technology may account for the differences noted. Graphs of citation patterns are used to trace the effect of three intellectual innovations on the social and intellectual structures of the specialty.

Phys 81

Swatez, Gerald M. "The Social Organization of a University Laboratory," Minerva, 8 (January, 1970), 36-58.

(performance of research)

Study of research team working at the Radiation Laboratory, University of California. Analysis of the complex division of labor leads to characterization of high energy physics as an "industrial" science directed toward production of findings, reports, and new scientists. Consequences of the industrialization of basic physics research are discussed.

(Robert S. Anderson responds to this article, "Correspondence," Minerva 8 (April, 1970), 297-99. Recalls his experiences at the Fermi Institute, University of Chicago. Describes autonomy and reciprocity among groups, and the effect of relationships between individual scientists on relations between groups. Suggests further analysis of group research to determine which stages strain group solidarity and effectiveness, and which restore and maintain them.)

Phys 82

Vlachy, Jan. "Czechoslovak Physicists in Another Survey," Czechoslovak Journal of Physics, B22 (1972), 435-38.

(performance of research)

Study of 365 Czech physicists describes relationships found between number of specialized research areas per scientist and several variables: highest degree obtained, employment sector, type of activity, age, physics subfield. The highest level of diversity is found among holders of advanced or basic science degrees; diversity tends to increase with age. Physicists in university settings show more areas of research specialization than do scientists in the Academy or industry, and men report more specialties than women. Research diversity increases with the number of activities reported (basic research, teaching, applied research).

Phys 83

Vlachy, Jan. "Physics in Europe--Still More Sources of Evidence," Czechoslovak Journal of Physics, B30 (1980), 201-34.

(national comparisons)

Third in a series of bibliographies of publications of "the organization, management, manpower, funding, enrollment, teaching, communication patterns and sociology of physics in Europe." Contains 770 entries, bringing the series total to over 1500. Entries cover the last 25 years, and include 30 countries. Subjects of all the entries show the following breakdowns: management, manpower, funds--48%; education, teaching--21%; management, multidisciplinary data--14%; information output, sociology--9%; mixed--8%. Earlier bibliographies were published in 1978 (Czech. J. Phys., B28) and 1974 (Czech. J. Phys., B25).

Phys 84

Vlachy, Jan. "Some Creativity Patterns in Physical Science," Theorie A Methoda, 3 (no. 1, 1971), 83-96.

(structure of literature; performance of research)

Examines the growth of multiple authorship in research publications in physics, and in several subfields of the discipline. Analysis of a sample of world physics publication data shows a steady increase in the author-per-paper ratio, with single author papers declining from a 50% share to a 38% share of the total in the course of the past decade. Rates vary by subfield--over 70% of the articles in quantum field theory have single authors, while 6-10% of the articles in nuclear and elementary particle physics have 6 or more authors. The author suggests that statistical approaches may help to illuminate trends toward collaborative research in physics.

Phys 85

Weart, Spencer R. "The Physics Business in America, 1919-1940: A Statistical Reconnaissance," in The Sciences in the American Context: New Perspectives, Nathan Reingold (ed.) Washington, D.C.: Smithsonian Institution Press, 1979.

(development of disciplines and specialties)

Study of the development of physics between the two world wars reviews statistics on personnel, Ph.D. production, funding, sectors of employment, professional societies and publications. Comparing academic, industrial and government physicists, the author finds that in academia, despite the Depression, physicists "continued up the exponential, riding on rising enrollments, rising outside funding from foundations, and the beginnings of government grant support." Applied physicists in industry and government were harder hit, but made a swift recovery due to strength derived from rapid growth in the 20s. Although the apparent real strength lay in the academic sector, "this sector does seem to have drawn over the longer run upon industry." The author suggests that the relation between industrial and academic physics is important to the understanding of scientific development. A brief epilogue reviews statistics from the 60s and 70s, and suggests that the collapse in rates of growth in physics may lead to changes in the structure of the physics community.

Phys 86

White, D. Hywel and Sullivan, Daniel. "Social Currents in Weak Interactions," Physics Today, 32 (April, 1979), 40-47.

(structure of literature--specialty groups; recognition and reward)

Quantitative analytical techniques (co-citation analysis), applied to over 4000 physics articles, generate clusters of literature. Study of these clusters leads to the unexpected identification of an issue in weak interactions physics. Identification of the issue (experimental data seemed to threaten a significant theory) provides the basis for a case study in the reward system of physics. Several social/scientific roles played by different theorists and experimentalists in the community are examined.

Phys 87

Wilkes, John M. "Cognitive Issues Arising from Study in the Sociology of Science," paper prepared for the Annual Meeting of the American Psychological Association. New York: September, 1979.

(discovery process; paradigm characteristics; discipline comparisons)

for annotation see Chem 62

Phys 88

Wilkes, John and Neumann, Yoram. "The Influence of 'Style' on Choice of Specialty, Review Procedures and Academic Success," working paper, Worcester Polytechnical Institute (first author), March, 1979 (submitted to Journal of Higher Education).

(discovery process; performance of research; paradigm characteristics; career patterns; discipline comparisons)

for annotation see Chem 63

Phys 89

Yoels, William C. and Yoels, Brenda G. "The Structure of Scientific Fields and the Allocation of Editorships on Scientific Journals," Sociological Quarterly, 15 (Spring, 1974), 264-76.

(paradigm characteristics; recognition and reward; discipline comparisons)

for annotation see Socl 63

Phys 90

Zuckerman, Harriet A. "Patterns of Name Ordering Among Authors of Scientific Papers: A Study of Social Symbolism and its Ambiguity," American Journal of Sociology, 74 (November, 1968), 276-91.

(recognition and reward; performance of research; discipline comparisons)

for annotation see Biol 31

Phys 91

Zuckerman, Harriet and Merton, Robert. "Age, Aging and Age Structure in Science," in The Sociology of Science, Robert K. Merton. Chicago: University of Chicago Press, 1973.

(productivity--age; paradigm characteristics; discipline comparisons)

for annotation see Biol 32

Phys 92

Zuckerman, Harriet and Merton, Robert K. "Institutionalized Patterns of Evaluation in Science," in Sociology of Science, Robert K. Merton. Chicago: University of Chicago Press, 1973.

(publication practices; social stratification)

Includes a detailed study of the evaluation procedure for manuscripts submitted to The Physical Review (1948-1956). Differences in publications for physicists of different status are analyzed, and the role of the "referee system" is discussed. Authors find higher submission and acceptance rates among physicists of high status and higher acceptance rates among younger physicists of all ranks. No differences in rates of acceptance are linked to the relative status of referees and authors. They conclude that although errors in judgement may occur, "the developing institution of the referee system provides for warranted faith that what appears in the archives of science can generally be relied on."

POLITICAL SCIENCE

Poli 1

Baum, William C. et. al. "American Political Science before the Mirror: What Our Journals Reveal about the Profession," *Journal of Politics*, 38 (November, 1976). 895-917.

(information exchange; structure of literature; paradigm characteristics)

Investigates "how political scientists organize and communicate their research efforts and what they reveal about themselves and their disciplines in the ways in which they cite the work of their peers." Data from questionnaires sent to authors of multiple-author articles in *American Political Science Review* (1960-1975) show scholarly journals to be the most important form of communication (over books, personal communications, professional meetings, preprints), although citation patterns of five leading political science journals show a greater number of references to books than to journals. Questionnaire responses and publication data show some trend toward multiple authorship and team research (with division of labor on the basis of statistical and methodological expertise), though not to the degree found in the hard sciences. Disciplinary differences in journal acceptance rates and space per article are examined, and paradigm development in political science is discussed.

Poli 2

Beyer, Janice M. "Editorial Policies and Practices Among Leading Journals in Four Scientific Fields," *Sociological Quarterly*, 19 (Winter, 1978), 66-88.

(paradigm characteristics; publication practices; discipline comparisons)

for annotation see Chem 5

Poli 3

Beyer, Janice M. and Lodahl, Thomas M. "A Comparative Study of Patterns of Influence in United States and English Universities," *Administrative Science Quarterly*, 21 (March, 1976), 104-29.

(discipline organization; paradigm characteristics; discipline comparisons; national comparisons)

for annotation see Chem 6

Poli 4

Beyer, Janice M. and Snipper, Reuben. "Objective Versus Subjective Indicators of Quality in Graduate Education," *Sociology of Education*, 47 (1974), 541-57.

(university ratings; paradigm characteristics; discipline comparisons)

for annotation see Chem 7

Poli 5

Beyer, Janice M. and Stevens, John M. "Differences Between Scientific Fields in Patterns of Research Activity and Productivity," paper number 195, State University of New York at Buffalo. School of Management, October, 1974.

(performance of research; paradigm characteristics; discipline comparisons)

for annotation see Chem 8

Poli 6

Beyer, Janice M. and Stevens, John M. "Factors Associated With Changes in Prestige of University Departments," Research in Higher Education, 7 (1977), 229-55.

(university ratings; discipline comparisons)

for annotation see Chem 9

Poli 7

Bonjean, Charles M. and Hullum, Jan. "Reasons for Journal Rejection: An Analysis of 600 Manuscripts," PS, 9 (Fall, 1978), 480-83.

(publication practices)

for annotation see Econ 3

Poli 8

Cartter, Allan M. An Assessment of Quality in Graduate Education. Washington, D. C.: American Council on Education, 1966.

(university ratings)

for annotation see Econ 4

Poli 9

Collins, Randall. "The Organization of the Intellectual World," in Conflict Sociology, Randall Collins. New York: Academic Press, 1979.

(discipline organization; competition; discipline comparisons)

for annotation see Econ 6

Poli 10

Deutsch, Karl W., Platt, John and Senghass, Dieter. "Conditions Favoring Major Advances in Social Science," Science, 171 (February 5, 1971), 450-59.

(discovery process; discipline comparisons)

for annotation see Econ 8

Poli 11

Finnegan, R. B. "Research Note: Patterns of Influence in International Relations Research," Journal of International and Comparative Studies, 3 (1970), 84-106.

(social stratification; structure of literature)

"Articles dealing with international relations in three prestigious political science journals were examined for citations. Cited works were ranked according to their total citation counts to determine the most influential contributions to the field of international relations. Individual scholars were ranked by numbers of citations to their works; when the author compares his data with an earlier study by Russett, he finds considerable agreement on the most influential figures in the field. The citation data was then subdivided into two time periods, 1958-1963 and 1964-1969 in order to detect trends in the field; although citations to scholars and works fluctuate with time, no recognizable consensus in either time period could be established. Regarding the most important mode of publication, books were found to be cited most frequently, receiving 66% of the total; 31% of citations referred to periodical publications. Individual journals were ranked by numbers of citations received; as in other fields, a few journals predominated." (From Citation Analysis: An Annotated Bibliography, S. Cozzens, et. al. Philadelphia: Institute for Scientific Information, May 1978.)

Poli 12

Furner, Mary O. Advacacy and Objectivity: A Crisis in the Professionalization of American Social Science, 1865-1905. Lexington: University Press of Kentucky, 1975.

(development of disciplines and specialties; professional associations)

for annotation see Econ 10

Poli 13

Hargens, Lowell L. Patterns of Scientific Research: A Comparative Analysis of Research in Three Scientific Fields. Washington, D.C.: The Arnold and Caroline Rose Monograph Series in Sociology, American Sociological Association, 1975.

(performance of research; paradigm characteristics; discipline comparisons)

for annotation see Chem 31

Poli 14

Hargens, Lowell L. "Relations Between Work Habits, Research Technologies, and Eminence in Science," Sociology of Work and Occupations, 5 (February, 1978), 97-112.

(performance of research; productivity; recognition and reward; discipline comparisons)

for annotation see Chem 32

Poli 15

Leege, David Calhoun. "Is Political Science Alive and Well and Living at NSF: Reflections of a Program Director at Midstream," PS, 9 (Winter, 1976), 8-17.

(funding of research)

Traces trends in the funding of basic research in political science by the National Science Foundation, 1966-1975 (includes comparisons with economics and anthropology). Reviews the origins and functions of the political science programs.

Poli 16

Lodahi, Janice Beyer and Gordon, Gerald. "Differences Between Physical and Social Sciences in University Graduate Departments," Research in Higher Education, 1 (1973), 191-213.

(paradigm characteristics; discipline organization; discipline comparisons)

for annotation see Chem 38

Poli 17

Lodahl, Janice Beyer and Gordon, Gerald. "Funding the Sciences in University Departments," Educational Record, 54 (no. 1, 1973), 74-82.

(funding of research; paradigm characteristics; university ratings; discipline comparisons)

for annotation see Chem 39

Poli 18

Lodahl, Janice Beyer and Gordon, Gerald. "The Structure of Scientific Fields and the Functioning of University Graduate Departments," American Sociological Review, 32 (February, 1972), 57-72.

(paradigm characteristics; graduate education; performance of research; discipline comparisons)

for annotation see Chem 40

Poli 19

Neumann, Yoram. "Predicting Faculty Success in University Graduate Departments," Research in Higher Education, 6 (1977), 275-87.

(recognition and reward; paradigm characteristics; discipline comparisons)

for annotation see Chem 44

Poli 20

Neumann, Yoram. "Predictors of Funding in Academic Fields," Research in Higher Education, 9 (1978), 115-22.

(funding of research; paradigm characteristics; discipline comparisons)

for annotation see Chem 45

Poli 21

Neumann, Yoram and Boris, Steven Barnet. "Paradigm Development and Leadership Style of University Department Chairpersons," Research in Higher Education, 9 (1978), 291-302.

(paradigm characteristics; discipline organization)

for annotation see Chem 46

Poli 22

Pfeffer, Jeffrey; Leong, Anthony and Strehl, Katherine. "Paradigm Development and Particularism: Journal Publication in Three Scientific Disciplines," Social Forces, 55 (June, 1977), 938-51.

(paradigm characteristics; publication practices; discipline comparisons)

for annotation see Chem 47

Poli 23

Pfeffer, Jeffrey; Salancik, Gerald R. and Leblebici, Huseyin. "The Effect of Uncertainty on the Use of Social Influence in Organizational Decision Making," Administrative Science Quarterly, 21 (June, 1976), 227-46.

(paradigm characteristics; funding of research; discipline comparisons)

for annotation see Econ 14

Poli 24

Pfeffer, Jeffrey; Salancik, Gerald R. and Moore, William L. "Archival Indicators of Paradigm Development of Academic Disciplines," unpublished paper, School of Business Administration, University of California, Berkeley (first author), March, 1979.

(paradigm characteristics; graduate education; discipline comparisons)

for annotation see Biol 25

Poli 25

Reynolds, Paul Davidson. "Value Dilemmas in the Professional Conduct of Social Science," International Social Science Journal, 27 (no. 4, 1975), 563-611.

(attitudes and values; professional associations)

for annotation see Econ 17

Poli 26

Roettger, Walter B. "Strata and Stability: Reputations of American Political Scientists," PS, 11 (Winter, 1978), 6-13.

(social stratification)

A random sample of 599 members of the American Political Science Association (1975) is asked to identify political scientists who made the most significant contributions to the discipline during the periods 1945-1960, 1960-1970, 1970-present. Among the 317 responses received, there is great stability among the top ten names for the first two periods. Dispersion increases as the tenth rank is approached, and as the time moves forward. The rankings reflect a principle concern with American political phenomena, and illustrate trends in the discipline toward the acceptance of behavioralism and quantitative techniques. Most of the "elite" scientists received their doctorates from prestige universities (Yale and Harvard predominate). The role of prestige universities in the definition of professional excellence is discussed.

Poli 27

Schick, Allen. "Political Science Isn't As Political Science Does," PS, 9 (Summer, 1976), 276-78.

(social stratification)

An analysis of "ruling elites" in American political science during the period 1946-1975, based on a study of office holders and council members of the American Political Science Association, and board members of the American Political Science Review. Academic political scientists hold leadership positions in much greater proportion than their proportion of APSA membership. Among non-academic scientists, there is a "pecking order" headed by scientists at research organizations, followed by federally employed political scientists, state and locally employed political scientsts, and holders of elective office. The article, although somewhat tongue-in-cheek, draws attention to the weak links between practitioners and scholars in political science.

Poli 28

Somit, Albert and Tanenhaus, Joseph. American Political Science: A Profile of a Discipline. New York: Atherton Press, 1964.

(paradigm characteristics; recognition and reward; social stratification; discipline organization)

Study of the American political science community, based on the survey of a systematic sample of academic and non-academic political scientists. (Over 800 scientists were surveyed; over 400 usable responses were received.) Chapters address the following issues: state of the discipline (consensus or conflict?); key issues in the field; prestige departments; "blessings" of prestige; fields of political science; political science "hall of fame"; the road to success--"who gets what how"; journals; the establishment; the "have-nots"; career satisfaction.

Poli 29

Storer, Norman. "Relations Among Scientific Disciplines," in The Social Contexts of Research, Saad Z. Nagi and Ronald G. Corwin (eds.) New York: Wiley Interscience, 1972.

(paradigm characteristics; recognition and reward; discipline comparisons)

for annotation see Biol 28

Poli 30

Yoels, William C. and Yoels, Brenda G. "The Structure of Scientific Fields and the Allocation of Editorships on Scientific Journals," Sociological Quarterly, 15 (Spring, 1974), 264-76.

(paradigm characteristics; recognition and reward; discipline comparisons)

for annotation see Socl 63

PSYCHOLOGY

Psyc 1

Anderson, Richard C.; Narin, Francis and McAllister, Paul. "Publication Ratings versus Peer Ratings of Universities," Journal of the American Society for Information Science, 29 (March, 1978), 91-103.

(university ratings; discipline comparisons)

for annotation see Biol 2

Psyc 2

Bayer, Alan E. and Dutton, Jeffrey E. "Career Age and Research-Professional Activities of Academic Scientists," Journal of Higher Education, 48 (May/June 1977), 259-82.

(productivity--age; discipline comparisons)

for annotation see Bioc 1

Psyc 3

Ben-David, Joseph and Collins, Randall. "Social Factors in the Origins of a New Science: The Case of Psychology," American Sociological Review, 31 (August, 1966), 461-65.

(development of disciplines and specialties; national comparisons)

Traces the development of a new intellectual identity and a new occupational role in psychology that resulted from the mobility of physiologists and the receptivity of speculative philosophy to persons and ideas which would turn the study of the human mind into an experimental science. Germany provides the positive case, France, Britain and the U. S. negative cases of these factors in development of a new discipline.

Psyc 4

Bode, Jerry G. "The Silent Science," American Sociologist, 7 (May, 1972), 3-5.

(information exchange; attitudes and values; discipline comparisons)

for annotation see Socl 9

Psyc 5

Clark, Kenneth E. America's Psychologists: A Survey of a Growing Profession. Washington, D.C.: American Psychological Association, 1957.

(recognition and reward; social stratification)

Study of American psychologists includes an approach to the identification of eminent scientists and an analysis of relation of eminence to other criteria (Psychological Abstract counts, Annual Review citations, journal citation counts, APA offices held, number of votes received from judges asked to list significant contributors). The highest correlation is between journal citation counts and votes received. (Annotation drawn from Evaluative Bibliometrics, Francis Narin. New Jersey: Computer Horizons, Inc., 1976.)

Psyc 6

Cole, Stephen. "Age and Scientific Performance," American Journal of Sociology, 84 (January, 1979), 958-77.

(productivity--age; paradigm characteristics; discipline comparisons)

for annotation see Chem 15

Psyc 7

Cole, Stephen. "Scientific Reward Systems: A Comparative Analysis." in Research in Sociology of Knowledge, Sciences and Art. Robert A. Jones (ed.) Greenwich, Connecticut: JAI Press, Inc. 1978.

(recognition and reward; paradigm characteristics; discipline comparisons)

for annotation see Bioc 4

Psyc 8

Cole, Stephen; Cole, Jonathan and Dietrich, Lorraine. "Measuring the Cognitive State of Scientific Disciplines," in Toward a Metric of Science, Y. Elkana, et al. (eds.) New York: John Wiley and Sons, 1978.

(paradigm characteristics; discipline comparisons)

for annotation see Bioc 5

Psyc 9

Collins, Randall. "The Organization of the Intellectual World," in Conflict Sociology, Randall Collins. New York: Academic Press, 1979.

(discipline organization; competition; discipline comparisons)

for annotation see Econ 6

Psyc 10

Crawford, S. Y. "Informal Communication Among Scientists in Sleep Research," Journal of the American Society for Information Science, 22 (Sept-Oct, 1971), 301-10.

(information exchange)

"A group of 218 scientists who were active in the field of sleep research were polled about their informal communication habits. Networks constructed from the data indicate a small group of 33 sociometrically central scientists, to which 95% of the total scientists were linked directly or indirectly. The networks also show the existence of research 'centers' (in this case: New York, Los Angeles, San Francisco, Boston, Chicago), in which scientists cluster. A related study (Crawford S. 'Communication Centrality and Performance' proceedings of the American Society for Information Science, Philadelphia, PA 1970) also shows that these central scientists tend to be the highly cited ones as well as the most productive." (From Citation Analysis: An Annotated Bibliography, S. Cozzens, et al. Philadelphia: Institute for Scientific Information, May, 1978.)

Psyc 11

Deutsch, Karl W., Platt, John and Senghass, Dieter. "Conditions Favoring Major Advances in Social Science," Science, 171 (February 5, 1971), 450-59.

(discovery process; discipline comparisons)

for annotation see Econ 8

Psyc 12

Edge, David O. and Mulkay, Michael J. Astronomy Transformed. New York: John Wiley and Sons, 1976.

(development of disciplines and specialties; discipline comparisons)

for annotation see Astr 2

Psyc 13

Finison, L. J. and Whittemore, C. L. "Linguistic Isolation of American Social Psychology: A Comparative Study of Journal Citation," American Psychologist, 30 (no. 4, 1975), 513-16.

(structure of literature)

"Nine American journals of social psychology were sampled at five year intervals between 1942 and 1970 and the percentage of citations to English language publications was calculated. The authors compared their results with the extent of English-language citation in the natural and social sciences derived from prior studies, and found much more extensive foreign-language citation among the natural sciences. Perusal of the social psychology literature as early as the 1920's shows no significant variation; throughout the period 1920-1970, English language citations consistently surpass the 90% mark." (From Citation Analysis: An Annotated Bibliography, S. Cozzens, et al. Philadelphia: Institute for Scientific Information, May, 1978.)

Psyc 14

Friedlander, Frank. "Performance and Orientation Structure of Research Scientists," *Organizational Behavior and Human Performance*, 6 (March, 1971), 169-83.

(performance of research; discipline comparisons)

for annotation see Biol 6

Psyc 15

Garvey, William D. and Griffith, Belver C. (eds.) *Reports of the American Psychological Association's Project on Scientific Information Exchange in Psychology*. Volumes 1 and 2. Washington, D. C.: American Psychological Association, 1963, 1965.

(information exchange)

Reports on formal and informal communication include studies of publication patterns, journal usage, information exchange at conventions and among members of psychological associations. Data suggest that only 10% of psychologists are active in scientific communication (publish and present information, advise on grants, etc.). Only a small portion of all information becomes published, the published information is relatively old, and there seems to be low readership for each published article. Those active in information exchange maintain contact with current work through informal channels: membership in small groups, attendance at meetings and conferences, and through correspondence. (See also Psyc 17.)

Psyc 16

Gottfredson, Stephen D. "Evaluating Psychological Research Reports: Dimensions, Reliability, and Correlates of Quality Judgements," *American Psychologist*, 33 (October, 1978), 920-34.

(publication practices)

Investigates three major aspects of the peer-evaluation system for publication in psychology: (1) criteria for assessment of quality, (2) reliability of peer judgement of quality and (3) the relationship between citation and peer judgement of quality. A survey of three hundred editors and editorial consultants from nine major psychology journals shows substantial agreement on desireable article characteristics and application of assessment norms. For a sample of published articles, quality evaluation by over 500 expert judges is only modestly correlated with subsequent citation rates.

Psyc 17

Griffith, Belver C. (ed.) *Reports of the American Psychological Association Project on Scientific Information Exchange in Psychology*. Volume 3 Washington, D. C.: American Psychological Association, 1969.

(information exchange)

An analysis of communication innovations introduced as a result of earlier studies in the project, and a reevaluation of scientific communication patterns with respect to special interest groups ("invisible colleges"). Includes study of information needs of teachers of psychology. Suggests need for further studies: on information needs of young researchers and applied psychologists; social organization and research productivity; affects of "national environments" on the functioning of psychology. (See also Psyc 15.)

Psyc 18

Griffith, Belver C. and Mullins, Nicholas C. "Coherent Social Groups in Scientific Change," *Science*, 177 (September 15, 1972), 959-64.

(development of disciplines and specialties; discipline comparisons)

for annotation see Bioc 8

Psyc 19

Knox, Wilma J. "Obtaining a Ph.D. in Psychology," *American Psychologist*, 25 (November, 1970), 1026-32.

(graduate education)

Examines data on doctoral psychology students at four universities (1955-64). Marital status, age at entrance, undergraduate major, master's degree status and graduate major are compared in order to identify characteristics of those students who complete, withdrew or are continuing in the program. Reviews earlier studies on professional training.

Psyc 20

Krantz, D. L. "Schools and Systems: The Mutual Isolation of Operant and Non-Operant Psychology as a Case Study," *Journal of History of the Behavioral Sciences*, 8 (1972), 86-102.

(paradigm characteristics)

Examines the "social dimensions of intellectual isolation in 'schools'." The establishment of specialty journals, and their self-citation patterns, are used as measures of conceptual isolation. Interviews and questionnaire data focus on the "self-image" of the Columbia University (operant) school. (Drawn from *Citation Analysis: An Annotated Bibliography*, S. Cozzens, et al. Philadelphia: *Institute for Scientific Information*, May 1978.)

Psyc 21

Lawler, Edward E. III and Carol O. "Who Cites Whom in Psychology," *Journal of General Psychology*, 73 (July, 1965), 31-36.

(structure of literature—citation rates)

Compares characteristics of the literature and of highly cited authors in three "hard" and three "soft" journals in psychology. The average age of cited articles is older in the "hard" journals. Lists of ten most frequently cited authors in hard and soft journals have only two names in common. The authors conclude that "psychologists who are cited frequently in both fields prove to be methodologists, psychologists who have developed a fashionable technique, and a few psychologists of broad interest."

Psyc 22

Lindsey, Duncan. "Distinction, Achievement, and Editorial Board Membership," American Psychologist, 31 (November, 1976), 799-804.

(publication practices)

Discusses the role of professional journals in the screening and dissemination of scientific information, and their influence in the social system of science. Examines the editorial board membership for 18 journals (psychology--5; sociology--6; social work--7). Study of the scientific contribution of board members (productivity, citation rates, highest degree, current employment and professional positions) indicates "that editors are characterized by the distinction of their own work and by their expertise in the area under review." (See also Psyc 23.)

Psyc 23

Lindsey, Duncan. "Participation and Influence in Publication Review Proceedings: A Reply," American Psychologist, 32 (July, 1977), 579-86.

(publication practices)

Survey of approximately 80 editors of psychology and sociology journals provides data for further analysis of the structure of editorial boards and measures of editorial influence. (See Psyc 22.) The author finds, for the two fields examined, different patterns of editorial board participation and influence in the manuscript review process. In psychology, the data suggest that the superior scientific achievement of board members serves to enhance the prestige of a journal; board members do not have a large role in the process of manuscript review. In sociology, eminent and highly productive scientists serving on editorial boards participate to a greater degree in the review process.

Psyc 24

Marshall, Louise H. "Maturation and Current Status of Neuroscience: Data from the 1976 Inventory of U.S. Neuroscientists," Experimental Neurology, 64 (1979), 1-32.

(development of disciplines and specialties)

for annotation see Biol 14

Psyc 25

McAllister, Paul R.; Anderson, Richard C. and Narin, Francis. "Comparison of Peer and Citation Assessment of the Influence of Scientific Journals," Journal of the American Society for Information Science, (May, 1980), 147-52.

(structure of literature--journal influence; discipline comparisons)

for annotation see Biol 15

Psyc 26

Meyers, Roger C. "Journal Citations and Scientific Eminence in Contemporary Psychology," American Psychology, (November, 1970), 1041-48.

(structure of literature--citation rates; social stratification)

Study "to determine whether the frequency with which a psychologist's publications are cited in the journal literature is a reliable and valid measure of his eminence in contemporary psychology." A ranked list of over 3,000 authors who received six or more citations (in a sample of 14 journals, 1962-67) is compiled. Information on the offices, awards, organization membership, and quality of department is compared with citation rankings. The data suggest that "psychologists who are judged to be scientifically eminent on the basis of a variety of other independent criteria are also those most frequently cited in current journal literature, but citation counts should not be used uncritically."

Psyc 27

Narin, Francis. Evaluative Bibliometrics: The Use of Citation Analysis in the Evaluation of Scientific Activity. New Jersey: Computer Horizons, Inc., 1976.

(structure of literature--journal influence; discipline comparisons)

for annotation see Biol 21

Psyc 28

Pasewark, Richard A.; Fitzgerald, B. J. and Sawyer, Robert N. "Psychology of the Scientists: XXXII. God at the Synapse: Research Activities of Clinical, Experimental and Physiological Psychologists," Psychological Reports, 36 (April, 1975), 671-74.

(productivity)

Study of 423 members of three American Psychological Association divisions compares publication rates for experimental, physiological and clinical psychologists. Relationships of productivity to age, sex, membership status in the American Psychological Association, and academic affiliation are also explored.

Psyc 29

Pfeffer, Jeffrey; Salancik, Gerald R. and Leblebici, Huseyin. "The Effect of Uncertainty on the Use of Social Influence in Organizational Decision Making," Administrative Science Quarterly, 21 (June, 1976), 227-46.

(paradigm characteristics; funding of research; discipline comparisons)

for annotation see Econ 14

Psyc 30

Pfeffer, Jeffrey; Salancik, Gerald R. and Moore, William L. "Archival Indicators of Paradigm Development of Academic Disciplines," unpublished paper, School of Business Administration, University of California, Berkeley (first author), March, 1979.

(paradigm characteristics; graduate education; discipline comparisons)

for annotation see Biol 25

Psyc 31

Pinski, Gabriel and Narin, Francis. "Structure of Psychological Literature," Journal of the American Society for Information Science, 30 (May, 1979), 161-68.

(structure of literature)

Applies citation analysis to 98 journals in psychology in order to study research activity. The identification of patterns of influence and information flow among the journals helps to identify interaction between subfields, and also provides a measure of publication activity that could be used to evaluate programs. Discussion covers the subfields of general psychology, clinical psychology, developmental and child psychology, personality and social psychology, experimental psychology, behavioral science, and a miscellaneous category.

Psyc 32

Platz, Arthur. "Psychology of the Scientists: XI. Lotka's Law and Research Visibility," Psychological Reports, 16 (1965), 566-68.

(structure of literature--citation rates; productivity)

Study of publication and citation rates in psychological literature. Lotka's law shows that a large portion of published research is contributed by a relatively small percentage of researchers. Citation studies show that a large portion of citations are received by a relatively small percentage of articles. Although productivity and citation curves exhibit similar forms, analysis of the relative position of specific individuals in the two distributions is important. Reanalysis of data from a 1954 sample of 160 American psychologists "suggests that there is little relation between the number of articles published by an author and the number of citations he receives per article."

Psyc 33

Porter, A. L. and Wolfle, D. "Utility of the Doctoral Dissertation," American Psychologist, 30 (no. 11, 1975), 1054-1061.

(graduate education)

"A questionnaire from 105 psychologists who received Ph.D.s in 1963-64 investigates attitudes on several dimensions of the doctoral process. Among these are: availability of advisor, selection of topics, the value of the Ph.D. as training, expected characteristics of the dissertation (originality, significance, positive findings, scale of effort), and attitudes toward alternatives to dissertations. The respondents were also classified by their present position (academic or non-academic, clinical lab, etc.) and by their major activity (administration, research, teaching, clinical). Citation data on dissertation-inspired or related work is correlated with the questionnaire dimensions. Findings are supportive of present practices. Ph.D. work averaged significantly higher numbers of citations than other work, and most supported the learning value of the process while acknowledging a dominant role played by their advisor. The perceptions of research-employed and practically-employed scientists differed. The 105 respondents represented 55% of the original mailing and had significantly higher productivity as measured by psychological abstracts than non-respondents." (From Citation Analysis: An Annotated Bibliography, S. Cozzens, et al. Philadelphia: Institute for Scientific Information, May, 1978.)

Psyc 34

Reynolds, Paul Davidson. "Value Dilemmas in the Professional Conduct of Social Science," International Social Science Journal, 27 (no. 4, 1975), 563-611.

(attitudes and values; professional associations)

for annotation see Econ 17

Psyc 35

Roe, Anne. The Making of A Scientist. New York: Dodd, Mead and Company, 1952.

(discovery process; discipline comparisons)

for annotation see Biol 26

Psyc 36

Small, H. G. and Crane, D. "Specialties and Disciplines in Science and Social Science: An Examination of their Structure Using Citation Indexes," Scientometrics, 1 (August, 1979), 445-61.

(structure of literature; discipline comparisons)

for annotation see Econ 21

Psyc 37

Storer, Norman. "Relations Among Scientific Disciplines," in The Social Contexts of Research, Saad Z. Nagi and Ronald G. Corwin (eds.) New York: Wiley Interscience, 1972.

(paradigm characteristics; recognition and reward; discipline comparisons)

for annotation see Biol 28

Psyc 38

Wispe, Lauren G. "Traits of Eminent American Psychologists," Science, 141 (September, 1963), 1256-61.

(social stratification; attitudes and values; recognition and reward; graduate education)

A survey of 95 eminent psychologists and a matched control group, provides data for a study of distinguishing characteristics of eminent psychologists. This article reports on a part of the survey that focused on faculty-student relations. Four faculty characteristics are considered: eminence, altruism, professional commitment and research ability. An analysis of the data suggests that there is no significant difference in the ratings of eminent and non-eminent faculty on the factor "altruism", but eminent faculty have significantly higher mean scores in measures of professional commitment and research ability. Interaction between personality factors and the values recognized and rewarded by the university research system are also examined.

Psyc 39

Wispe, Lauren G. and Ritter, James H. "Where America's Recognized Psychologists Received Their Doctorates," American Psychologist, 19 (1964), 634-44.

(social stratification; recognition and reward; graduate education)

Investigates the doctoral origins of eminent psychologists to determine whether certain American universities have produced a disproportionately large share of recognized psychologists. Scientific recognition includes professional offices and awards, and starred entry in American Men of Science. High stability is found among the top ten departments. The number of graduates who later received professional recognition is more strongly related to department size than to the presence of eminent department members.

Psyc 40

Yoels, William C. and Yoels, Brenda G. "The Structure of Scientific Fields and the Allocation of Editorships on Scientific Journals," Sociological Quarterly, 15 (Spring, 1974), 264-76.

(paradigm characteristics; recognition and reward; discipline comparisons)

for annotation see Socl 63

Psyc 41

Zuckerman, Harriet and Merton, Robert. "Age, Aging and Age Structure in Science," in The Sociology of Science, Robert K. Merton. Chicago: University of Chicago Press, 1973.

(productivity--age; paradigm characteristics; discipline comparisons)

for annotation see Biol 32

SOCIOLOGY

Socl 1

Bayer, Alan E. and Dutton, Jeffrey E. "Career Age and Research-Professional Activities of Academic Scientists," Journal of Higher Education, 48 (May/June 1977), 259-82.

(productivity—age; discipline comparisons)

for annotation see Bioc 1

Socl 2

Ben-David, Joseph. "Sociology of Science: Introduction," International Social Science Journal, 22 (no. 1, 1970), 7-27.

(development of disciplines and specialties)

Traces two phases in the development of sociology of science, and examines the effect of external and internal factors. The beginning phase (1920's and 30's) and the current phase (post World War II) differ in social context (changed attitudes and expectations of science) and "professionalization" (social scientists have replaced natural scientists-turned-sociologist). Studies in the field have shifted their focus from explanation of concepts in science to the examination of scientific activity and its organization.

Socl 3

Beyer, Janice M. "Editorial Policies and Practices Among Leading Journals in Four Scientific Fields," Sociological Quarterly, 19 (Winter, 1978), 66-88.

(paradigm characteristics; publication practices; discipline comparisons)

for annotation see Chem 5

Socl 4

Beyer, Janice M. and Lodahl, Thomas M. "A Comparative Study of Patterns of Influence in United States and English Universities," Administrative Science Quarterly, 21 (March, 1976), 104-29.

(discipline organization; paradigm characteristics; discipline comparisons; national comparisons)

For annotation see Chem 6

Socl 5

Beyer, Janice M. and Snipper, Reuben. "Objective Versus Subjective Indicators of Quality in Graduate Education," Sociology of Education, 47 (1974), 541-57.

(university ratings; paradigm characteristics; discipline comparisons)

for annotation see Chem 7

Socl 6

Beyer, Janice M. and Stevens, John M. "Differences Between Scientific Fields in Patterns of Research Activity and Productivity," paper number 195, State University of New York at Buffalo, School of Management, October, 1974.

(performance of research; paradigm characteristics; discipline comparisons)

for annotation see Chem 8

Socl 7

Beyer, Janice M. and Stevens, John M. "Factors Associated With Changes in Prestige of University Departments," Research in Higher Education, 7 (1977), 229-55.

(university ratings; discipline comparisons)

for annotation see Chem 9

Socl 8

Boalt, Gunnar and Bergryd, Ulla. "The Decline and Fall of the Department Empire," International Social Science Journal, 24 (no. 4, 1972), 648-57.

(discipline organization; attitudes and values)

Study of academic sociology in Sweden--focuses on departmental chairholders. Discusses conflicts between their scientific, administrative and family roles.

Socl 9

Bode, Jerry G. "The Silent Science," American Sociologist, 7 (May, 1972), 3-5.

(information exchange; attitudes and values; discipline comparisons)

Examines publication patterns of professional sociologists in popular magazines and scientific journals, and compares them with patterns for psychologists and medical scientists. Popular magazines included in the study are Life, Ladies Home Journal, Reader's Digest and Science Digest. Scientific journals included are Science and Scientific American. For the periods studied (1960, 1970, 1975), a significantly smaller percentage of the sociological articles were written by professional sociologists, compared to statistics on psychological and medical articles. The data suggest that "sociologists are not making themselves heard in the literature that most people read, or in the journals that professionals in other fields read." The author discusses the effect of strong "informal norms" in sociology which do not support efforts to communicate outside of traditional channels.

Socl 10

Bonjean, Charles M. and Hullum, Jan. "Reasons for Journal Rejection: An Analysis of 600 Manuscripts," PS, 9 (Fall, 1978), 480-83.

(publication practices)

for annotation see Econ 3

Socl 11

Burt, Ronald S. "Stratification and Prestige Among Elite Experts in Methodological and Mathematical Sociology Circa 1975," Social Networks, 1 (November, 1978), 105-58.

(social stratification)

Identifies a system of "elite" scientists in methodological and mathematical sociology, and analyzes status in multiple networks. The form and content of stratification in the system of elites are examined, and five "structurally unique statuses" are described. The author finds that "the most prominent experts have merged their methodological concerns with specific substantive concerns." The strongest determinant of prestige is the record of published articles in 8 core journals. Mail questionnaires, published career data, and individual publication and editorial histories provide information on the 52 individuals studied.

Socl 12

Chubin, D. "The Journal as a Primary Data Source in the Sociology of Science: With Some Observations from Sociology," Social Science Information, 14 (no. 1, 1975), 157-68.

(structure of literature; information exchange; funding of research)

Explores the use of journals as "primary" data sources in sociology of science and demonstrates their utility for documenting changes in scientific disciplines. Study examines a sample of over 2400 articles from 10 sociology journals (1940-1970) for "ceremonial footnotes" reporting funding, presentation at professional meetings, acknowledgement of colleague comments, thesis research. Findings on changes in support trends and communication patterns are discussed.

Socl 13

Chubin, Daryl. "Sociological Manpower and Womanpower: Sex Differences in Career Patterns of Two Cohorts of American Doctorate Sociologists," American Sociologist, 9 (May, 1974), 83-92.

(career patterns; productivity; recognition and reward)

Examine careers of two cohorts of sociologists, those who received doctorates in 1935-39 (171 males, 63 females) and a matched sample of those who received doctorates in 1955-59. Data on research performance (publication and citation) and mobility are analyzed for the two cohorts, and sex differences are discussed. The author suggests that conventional "preditors of career success may be unreliable when applied to women Ph.D. sociologists." Research on career patterns of women sociologists may have to focus on non-academic and nonsociological sectors, where there is the greatest concentration of "sociological womenpower."

Socl 14

Clemente, Frank. "Early Career Determinants of Research Productivity," *American Journal of Sociology*, 79 (September, 1973), 409-19.

(productivity--age)

Assesses the efficiency of six independent variables as predictors of productivity in sociology. Publication records of over 2200 Ph.D. sociologists are examined in 22 journals (time period: 1940-70), and correlated with sex, age at Ph.D., years between B.A. and Ph.D., age at first publication, pre-Ph.D. publication, and quality of doctoral department. The data suggest that "only age at first publication and publication before Ph.D. exert important independent effects upon research productivity." Sex is a particularly weak predictor of publication output.

Socl 15

Cole, Jonathan R. and Zuckerman, Harriet. "The Emergence of A Scientific Specialty: The Self-Exemplifying Case of the Sociology of Science," in *The Idea of Social Structure: Papers in Honor of Robert K. Merton*, Lewis A. Coser (ed.) New York: Harcourt, Brace, Jovanovich, 1975.

(development of disciplines and specialties)

Authors suggest that as a scientific specialty, sociology of science "exhibits many of the social patterns its own practitioners study in other contexts, making it a convenient site for a sociological study of emerging systems. It is evolving its own system of stratification, its own arrangements for formal and informal communication, its own politics and its own lines of cognitive and social conflict, just as these have become major foci of attention in research by sociologists of science." Their study of sociology of science examines parameters of growth in personnel and in the production of literature, the processes of cognitive development, and the development of "organizational infrastructures."

Socl 16

Cole, Stephen. "Age and Scientific Performance," *American Journal of Sociology*, 84 (January, 1979), 958-77.

(productivity--age; paradigm characteristics; discipline comparisons)

for annotation see Chem 15

Socl 17

Cole, S. "The Growth of Scientific Knowledge: Theories of Deviance as a Case Study," in The Idea of Social Structure, L. A. Coser (ed.) New York: Harcourt Brace Jovanovich, Inc., 1975.

(paradigm characteristics; structure of literature--specialty groups; development of disciplines and specialties)

"In a further test of (Thomas) Kuhn's theories about the cognitive development of disciplines, Cole uses factor analysis of citations in the literature on the sociology of deviance to identify groups of authors who are cited by the same people. Interpretation of the cognitive significance of the groups depends upon subjective knowledge about the field. The paper also seeks to discuss the relationship between theoretical work and empirical research, focussing upon the impact of (Robert) Merton's theory of social structure and anomie (1938, 1949) on the specialty. Citation distributions . . . are used to indicate the degree of consensus within groups. Cole also finds that groups are more often identifiable by their interest in common subject matter (delinquency, mental illness, etc.) than by theoretical stance (anomie, symbolic interaction, etc.)" (From Citation Analysis: An Annotated Bibliography, S. Cozzens, et al. Philadelphia: Institute for Scientific Information, May, 1978.)

Socl 18

Cole, Stephen. "Scientific Reward Systems: A Comparative Analysis," in Research in Sociology of Knowledge, Sciences and Art. Robert A. Jones (ed.) Greenwich, Connecticut: JAI Press, Inc. 1978.

(recognition and reward; paradigm characteristics; discipline comparisons)

for annotation see Bioc 4

Socl 19

Cole, Stephen; Cole, Jonathan and Dietrich, Lorraine. "Measuring the Cognitive State of Scientific Disciplines," in Toward a Metric of Science, Y. Elkana, et al. (eds.) New York: John Wiley and Sons, 1978.

(paradigm characteristics; discipline comparisons)

for annotation see Bioc 5

Socl 20

Collins, Randall. "The Organization of the Intellectual World," in Conflict Sociology, Randall Collins. New York: Academic Press, 1979.

(discipline organization; competition: discipline comparisons)

for annotation see Econ 6

Socl 21

Crane, Diana. Invisible Colleges: Diffusion of Knowledge in Scientific Communities. Chicago: University of Chicago Press, 1972.

(development of disciplines and specialties; information exchange; discipline comparisons)

Explores the thesis that "the logistic growth of scientific knowledge is the result of the exploitation of intellectual innovations by a particular type of social community." Study of publication and citation patterns, and a questionnaire survey of scientists in two research areas (rural sociology, algebra of finite groups) provide data that illustrate interaction between cognitive growth and social organization, and that reveal the important role of informal communication networks ("invisible colleges") in the growth of scientific knowledge.

Socl 22

Crowley, Charles J. and Chubin, Daryl E. "The Occupational Structure of Science: a Log-Linear Analysis of the Inter-sectoral Mobility of American Sociologists," Sociological Quarterly, 17 (Spring, 1976), 197-217.

(career patterns)

Examines the careers of two cohorts of American sociologists (234 Ph.D. recipients in 1935-39 and 1955-59). Four job sectors are defined: Ph.D. granting sociology departments; B.A./M.A. granting sociology departments; other academic positions; positions in government, business and industry. Factors analyzed for their effect on movement among job sectors are age, sex, prestige of doctoral institution, previous mobility, publication performance. The data suggest that "(i)n general, structural factors supersede individual differences in explaining observed movement. Moreover, the evidence underscores the 'university bias' that has dominated studies of stratification in science."

Socl 23

Deutsch, Karl W.; Platt, John and Senghass, Dieter. "Conditions Favoring Major Advances in Social Science," Science, 171 (February 5, 1971), 450-59.

(discovery process; discipline comparisons)

for annotation see Econ 8

Socl 24

Diner, Steven J. "Department and Discipline: The Department of Sociology at the University of Chicago, 1892-1920," Minerva, 13 (Winter, 1975), 514-43.

(development of disciplines and specialties; discipline organization)

Examines unique factors in the development of the department of sociology at Chicago: departmental independence, support from university president, role of chairman Albion Small, immediate visibility of social conditions and the activity of social reformers in Chicago, shared publishing institutions, availability of careers for graduates.

Socl 25

Furner, Mary O. Advocacy and Objectivity: A Crisis in the Professionalization of American Social Science, 1865-1905. Lexington: University Press of Kentucky, 1975.

(development of disciplines and specialties; professional associations)

for annotation see Econ 10

Socl 26

Griffith, Belver C. and Mullins, Nicholas C. "Coherent Social Groups in Scientific Change," Science, 177 (September 15, 1972), 959-64.

(development of disciplines and specialties, discipline comparisons)

for annotation see Bioc 8

Socl 27

Gross, George R. "The Organization Set: A Study of Sociology Departments," American Sociologist, 5 (February, 1970), 25-29.

(social stratification; career patterns)

Examines how "organizational prestige influences individual status" in sociolgy. Focuses on the entry and interchange of faculty at the top twenty sociology departments. Data show that the top five departments produce more Ph.D.s than the remainder of the top twenty, and nearly one-third of all degrees granted; 73% of the faculty in the top five departments received degrees from their own or from other top five departments. The author suggests that there is only a slight chance that graduates from departments not ranked among the top twenty will obtain positions in one of the top five sociology departments.

Socl 28

Knudson, Dean D. and Vaughn, Ted R. "Quality in Graduate Education: A Re-evaluation of the Rankings of Sociology Departments in the Cartter Report," American Sociologist, 4 (February, 1969), 12-19.

(university ratings)

Uses departmental publication records in three journals (American Sociological Review, American Journal of Sociology, Social Forces) as measures of academic quality. Finds that these measures agree with subjective rankings (Allan Cartter, American Council on Education, 1966) for only the top four departments. Suggests that attempts to use objective measures may produce a bias in favor of larger departments.

Socl 29

Kuklick, Henrika. "A 'Scientific Revolution': Sociological Theory in the U.S., 1930-1945," Sociological Inquiry, 43 (no. 1, 1973), 3-22.

(development of disciplines and specialties; paradigm characteristics)

Traces shifts in the social and intellectual structure of academic sociology, through content analysis of the American Sociological Review and the American Journal of Sociology. Applies Kuhn's ideas of paradigm change to the shift in pre-eminence from the Chicago School (identified with the AJS) to the structural-functionalists, whose growing influence corresponds to the election of non-Chicago trained sociologists to leadership positions in professional organizations and the subsequent founding of the ASR.

Socl 30

Lewis, Lionel S. "On Subjective and Objective Rankings of Sociology Departments," American Sociologist, 3 (May, 1968), 129-31.

(university ratings)

Compares American Council on Education ratings of sociology graduate departments (Allan Cartter, 1966) to rankings based on the productivity of faculty members and doctoral graduates (articles, research reports and notes published in the American Sociologial Review). The two rankings are similar; in cases where rankings by productivity are lower than the ACE rankings, the universities are either small private institutions, or have one or two eminent scholars in their department. The presence of "stars" seems to have a strong influence on subjective prestige rankings.

Socl 31

Lightfield, Timothy. "Output and Recognition of Sociologists," American Sociologist, 6 (May, 1971), 128-33.

(recognition and reward; productivity)

Measures the quantity and quality of research papers for a sample of 200 sociologists, examines how output is related to the rank of the Ph.D. granting department and what role output plays in peer recognition. Quantity is measured by counting the number of research papers produced, quality is measured by counting the number of citations received in three core sociology journals and peer recognition is determined by a survey of sociology faculties. Data suggest: there is a high correlation between quality and quantity of output; the rank of the Ph.D. department influences quantity and quality of output; early productivity is an indicator of later productivity. An unexpected finding is that quantity of work is as important a factor as quality of work in peer recognition.

Socl 32

Lin, Nan and Nelson, Carnot E. "Bibliographic Reference Patterns in Core Sociological Journals, 1965-1966," *American Sociologist*, 4 (February, 1969), 47-50.

(structure of literature--journal influence; discipline comparisons)

Compares referencing patterns in three sociological journals (*American Sociological Review*, *American Journal of Sociology*, *Social Forces*) to patterns in a physical science journal (*Journal of the Optical Society of America*). Data suggest that a hierarchy exists among the three sociological journals, and that the referencing patterns of the sociological journals and the physics journal are strikingly different. The hierarchy of journals (1. *ASR*, 2. *AJS*, 3. *Social Forces*) is consistent for the following measures: frequency of references made to the journal; institutional affiliation of the authors; and patterns of resubmission. Comparisons of the two types of journals show that sociological journals contain twice as many references per article, and that more references are to books than to journals; the physics journal contains more multi-author papers, and references are made to journals more often than to books.

Socl 33

Lindsey, Duncan. "Distinction, Achievement, and Editorial Board Membership" *American Psychologist*, 31 (November, 1976), 799-804.

(publication practices)

for annotation see Psyc 22

Socl 34

Lindsey, Duncan. "Participation and Influence in Publication Review Proceedings: A Reply," *American Psychologist*, 32 (July, 1977), 579-86.

(publication practices)

for annotation see Psyc 23

Socl 35

Lodahl, Janice Beyer and Gordon, Gerald. "Differences Between Physical and Social Science in University Graduate Departments," *Research in Higher Education*, 1 (1973), 191-213.

(paradigm characteristics; discipline organization; discipline comparisons)

for annotation see Chem 38

Socl 36

Lodahl, Janice Beyer and Gordon, Gerald. "Funding the Sciences in University Departments," *Educational Record*, 54 (no. 1, 1973), 74-82.

(funding of research; paradigm characteristics; university ratings; discipline comparisons)

for annotation see Chem 39

Socl 37

Lodahl, Janice Beyer and Gordon, Gerald. "The Structure of Scientific Fields and the Functioning of University Graduate Departments," American Sociological Review, 32 (February, 1972), 57-72.

(paradigm characteristics; graduate education; performance of research; discipline comparisons)

for annotation see Chem 40

Socl 38

Lofland, John. "Styles of Reporting Qualitative Field Research," American Sociologist, 9 (August, 1974), 101-11.

(performance of research; paradigm characteristics; information exchange)

Examines research traditions in sociology, and suggests that qualitative field research (participant-observation and/or qualitative interviewing) is distinct from laboratory and experimental work, from demographic studies, and from library research, in "the degree to which its practitioners lack a public, shared, and codified conception of how what they do is done, and how what they report should be formulated." Several styles of reporting and evaluating qualitative field research are discussed. Low consensus and codification are attributed to a tradition that qualitative and field methods are "exploration and discovery" devices, and to their image as an area of individual research, with a low level of technology.

Socl 39

Merton, Robert K. "The Sociology of Science: An Episodic Memoir," in The Sociology of Science in Europe and America, Jerry Gaston and Robert K. Merton (eds.). Carbondale and Edwardsville: Southern Illinois University Press, 1977.

(development of disciplines and specialties)

A review of the development of sociology of science focusing primarily on American sociology. Includes sections on Cognitive and Social Identities, Institutionalization of the Sociology of Science, Transfer of Research Procedures, Specialty-Specific Research Procedures, notes on the influence of George Sarton and Karl Popper, and an analysis of the social and intellectual contexts of Thomas Kuhn's contributions (a detailed study of his career).

Socl 40

Morrissey, Joseph P. and Steadman, Henry J. "Practice and Perish?: Some Overlooked Career Contingencies for Sociologists in Nonacademic Settings," *American Sociologist*, 12 (November, 1977), 154-62.

(career patterns; recognition and reward; information exchange)

Discusses the trend toward increasing employment of sociologists outside the academic setting, and the effect this trend may have on the discipline. Reviews suggestions for change (different training for students, establishment of university-based consultants, development of new inter-disciplines), and suggests that traditional participation in communication networks (including professional recognition derived from scholarly publications) may be constrained in nonacademic settings. The profession of sociology must analyze and resolve communication problems in order to make nonacademic careers viable.

Socl 41

Mullins, Nicholas with Mullins, Carolyn J. *Theories and Theory Groups in Contemporary Sociology*. New York: Harper and Row, 1973.

(development of disciplines and specialties)

Proposes a model for the development of theories and theory groups in science. Outlines four stages of development (normal; network; cluster; specialty or discipline), examines their different social and intellectual characteristics, and suggests that the most important aspect of the development process is the communication structure. The model is applied to eight theories and theory groups in sociology.

Socl 42

Neumann, Yoram. "Predicting Faculty Success in University Graduate Departments," *Research in Higher Education*, 6 (1977), 275-87.

(recognition and reward; paradigm characteristics; discipline comparisons)

for annotation see Chem 44

Socl 43

Neumann, Yoram. "Predictors of Funding in Academic Fields," *Research in Higher Education*, 9 (1978), 115-22.

(funding of research; paradigm characteristics; discipline comparisons)

for annotation see Chem 45

Socl 44

Neumann, Yoram and Boris, Steven Barnet. "Paradigm Development and Leadership Style of University Department Chairpersons," Research in Higher Education, 9 (1978), 291-302.

(paradigm characteristics; discipline organization)

for annotation see Chem 46

Socl 45

Oromaner, Mark. "Career Contingencies and the Fate of Sociological Research," Social Science Information, (April, 1973), 97-111.

(structure of literature--citation rates)

Study focuses on factors that influence citation rates of publications in sociology. One hundred fourteen full length single-author articles appearing in issues of Social Forces, American Journal of Sociology and American Sociological Review in 1960 are identified. Citations received by the articles during the ten year period following publication are recorded. The data suggest that journal of publication and prestige of the author's Ph.D. department have more influence on citation rates than professional age or present academic affiliation of the author.

Socl 46

Oromaner, Mark. "The Career of Sociological Literature: A Diachronous Study," Social Studies of Science, 7 (February, 1977), 126-32.

(structure of literature--citation rates)

Studies the obsolescence of sociological literature using a "diachronous" approach that traces the citations received by a sample of articles in subsequently published research, rather than a "synchronous" approach that examines the date of references found in a sample of journals. All full length articles (145) appearing during 1960 in Social Forces, American Journal of Sociology and American Sociological Review are identified. Articles appearing in 10 sociological journals during the period 1961-70 are examined for references to the sample of 145 articles. Data show a concentration of citations for a small number of the articles (12%), and a hierarchy among the three core journals (Articles in ASR receive the most citations, followed by AJS and SF). There does not appear to be a decline in the number of sample articles cited, nor in the number of citations received by the sample articles, during the first 10 years after publication.

Socl 47

Oromaner, Mark. "Comparison of Influentials in Contemporary Sociology: A Study in the Internationalization of Sociology," British Journal of Sociology, 21 (September, 1970), 324-32.

(social stratification; national comparisons)

Influential sociologists are identified through a study of citations in a random sample of articles in two journals (American Sociological Review, British Journal of Sociology) taken at two time periods (I: 1958-62, II: 1967-68). Lists of highly cited sociologists are constructed and compared by nation and by time period. Although BJS lists for both time periods contain American scholars, ASR lists show no non-American scholars. Three names are the same on the BJS and ASR lists in time period I, and this figure increases to 8 in time period II. The author discusses implications that, in the near future, a trend toward "internationalization" in sociology means wider influence of American sociologists.

Socl 48

Oromaner, Mark. "Professional Age and the Reception of Sociological Publications: A Test of the Zuckerman-Merton Hypothesis," Social Studies of Science, 7 (August, 1977), 381-88.

(paradigm characteristics; structure of literature--citation rates)

Data on publications in the field of sociology are used to test the hypothesis that older authors have an advantage in fields with low codification of knowledge. All full length articles (145) appearing during 1960 in Social Forces, American Journal of Sociology and American Sociological Review are identified. Articles appearing in 10 sociological journals during the period 1961-70 are examined for citations to the 145 test articles. The data suggest that contrary to the hypothesis, professional age (time elapsed between year of Ph.D. and date of publication, 1960) does not influence the reception of sociological articles.

Socl 49

Oromaner, Mark. "The Structure of Influence in Contemporary Academic Sociology," American Sociologist, 7(May, 1972), 11-13.

(social stratification; graduate education)

Studies patterns of influence among sociology departments and among individual academic sociologists. Examines data on the Ph.D. granting institution and current affiliation of thirty-six highly cited sociologists, and on the departmental affiliation of authors cited in full length articles in American Sociological Review and Social Forces (1969-70). Data suggest that influence is concentrated among a relatively small number of sociologists, and that influential sociologists are concentrated in a small number of prestigious departments.

Socl 50

Pfeffer, Jeffrey; Leong, Anthony and Strehl, Katherine "Paradigm Development and Particularism: Journal Publication in Three Scientific Disciplines," Social Forces, 55 (June, 1977), 938-51.

(paradigm characteristics; publication practices; discipline comparisons)

for annotation see Chem 47

145

Socl 51

Pfeffer, Jeffrey; Salancik, Gerald R. and Leblebici, Huseyin. "The Effect of Uncertainty on the Use of Social Influence in Organizational Decision Making," Administrative Science Quarterly, 21 (June, 1976), 227-46.

(paradigm characteristics; funding of research; discipline comparisons)

for annotation see Econ 14

Socl 52

Pfeffer, Jeffrey; Salancik, Gerald R. and Moore, William L. "Archival Indicators of Paradigm Development of Academic Disciplines," unpublished paper, School of Business Administration, University of California, Berkeley (first author), March, 1979.

(paradigm characteristics; graduate education; discipline comparisons)

for annotation see Biol 25

Socl 53

Reynolds, Paul Davidson. "Value Dilemmas in the Professional Conduct of Social Science," International Social Science Journal, 27 (no. 4, 1975), 563-611.

(attitudes and values; professional associations)

for annotation see Econ 17

Socl 54

Shichor, David. "Prestige of Sociology Departments and the Placing of New Ph.D.s," American Sociologist, 8 (May, 1970), 157-60.

(social stratification; career patterns)

Examines patterns of hiring new Ph.D.s in sociology, and discusses the relation between prestige of the hiring department and the Ph.D. granting department. Information on the education and current position of 471 academic sociologists who received Ph.D.s between 1964 and 1966 is drawn from the 1967 American Sociological Association directory. Data suggest that Ph.D.s from the most prestigious departments are hired in turn by prestigious departments, with little upward movement of Ph.D.s from lower ranked departments to faculty positions with departments of higher rank. Author suggests that the main demand for new Ph.D.s will come from lower prestige departments, which may lead to a general upgrading of training in sociology.

Socl 55

Shils, Edward. "Tradition, Ecology and Institution in the History of Sociology," Daedalus, 99 (Fall, 1970), 760-825.

(development of disciplines and specialties; national comparisons)

Examines the development of the discipline of sociology, focusing on the following questions: "Why has the intellectual stock of sociology come to be what it is and why has it taken that form in particular places? Why have certain ideas which are now thought to be constitutive of sociology come to dominate the subject?" Contrasts the traditions and institutionalization of sociology in Europe and America, and traces the spacial movement of ideas. Discusses professionalization of the field, forms of work, and possible negative effects of increased specialization.

Socl 56

Small, H. G. and Crane, D. "Specialties and Disciplines in Science and Social Science: An Examination of their Structure Using Citation Indexes," Scientometrics, I (August, 1979), 445-61.

(structure of literature; discipline comparisons)

for annotation see Econ 21

Socl 57

Stehr, Nico and Larson, Lyle E. "The Rise and Decline of Areas of Specialization," American Sociologist, 7 (August, 1972), 3, 5-6.

(development of disciplines and specialties; career patterns)

Examines changes in areas of specialization in sociolgy. Results of a 1970 questionnaire survey of a sample of American Sociological Association members are compared to specialty lists from 1959 and 1950 studies. The data show some shift in rank order of specialties. Rankings of areas of specialization by age groups of sociologists show that areas of interest tend to be retained over time, which suggests that differences specific to generations of sociologists may persist. Change of specialties is slight among the youngest and oldest sociolgists; the largest number of changes occur among sociologists in the middle years bracket.

Socl 58

Storer, Norman. "Relations Among Scientific Disciplines," in The Social Contexts of Research, Saad Z. Nagi and Ronald G. Corwin (eds.) New York: Wiley Interscience, 1972.

(paradigm characteristics; recognition and reward; discipline comparisons)

for annotation see Biol 28

Socl 59

Van Rossum, Wouter. "The Development of Sociology in the Netherlands: A Network Analysis of the Editorial Board of the Sociologische Gids," in Social Processes of Scientific Development, Richard Whitley, (ed.) London and Boston: Routledge and Kegan Paul, Ltd., 1978.

(development of disciplines and specialties; publication practices)

Examination of the social structure of the editorial board of the journal Sociolgische Gids between 1953 (founding) and 1971 reflects the growth of a new generation of Dutch sociologists, and illustrates the relation between cognitive and social developments in scientific fields. Includes discussion of the academic origin of the editors and their affiliation with universities as faculty members, co-authorship connections between editors, and editorial policies. The nature of articles published over the time period examined, the appearance of textbooks, and formal academic recognition of sociology, are interrelated events which reflect the establishment of a shared paradigm.

Socl 60

Wilkes, John M. "Cognitive Issues Arising from Study in the Sociology of Science," paper prepared for the Annual Meeting of the American Psychological Association. New York: September, 1979.

(discovery process; paradigm characteristics; discipline comparisons)

for annotation see Chem 62

Socl 61

Wilkes, John and Neumann, Yoram. "The Influence of 'Style' on Choice of Specialty, Review Procedures and Academic Success," working paper, Worcester Polytechnical Institute (first author), March, 1979 (submitted to Journal of Higher Education).

(discovery process; performance of research; paradigm characteristics; career patterns; discipline comparisons)

for annotation see Chem 63

Socl 62

Yoels, William C. "The Fate of the Ph.D. Dissertation in Sociology: An Empirical Examination," American Sociologist, 8 (May, 1973), 87-9.

(information exchange)

Measures the extent to which sociology disssertations are disseminated in the discipline. Identifies 372 dissertations cited in the American Sociological Review and the American Journal of Sociology between 1955 and 1969 (out of an estimated 2500 Ph.D.'s awarded during that period). Dissertations of graduates from four prestigious departments received over 53% of the citations. Data suggest that colleagues are the most likely users and disseminators of Ph.D. dissertations.

Socl 63

Yoels, William C. with Yoels, Brenda G. "The Structure of Scientific Fields and the Allocation of Editorships on Scientific Journals," Sociological Quarterly, 15 (Spring, 1974), 264-76.

(paradigm characteristics; recognition and reward; discipline comparisons)

Examines the pattern of editorial appointments made by editors-in-chief of journals in seven disciplines (sociology, political science, psychology, economics, physics, chemistry, biology) to determine if different criteria of judgement apply in different disciplines; patterns in sociology are studied in detail. Focuses on the relationship between the doctoral origins of the editor-in-chief and those of his appointees. Suggests that in disciplines where there is no consensus on basic paradigms, "extra scientific" criteria (including the dominating influence of prestigious departments) affect the award of positions of influence.

Socl 64

Zuckerman, Harriet and Merton, Robert. "Age, Aging and Age Structure in Science," in The Sociology of Science, Robert K. Merton. Chicago: University of Chicago Press, 1973.

(productivity--age; paradigm characteristics; discipline comparisons)

for annotation see Biol 32

GENERAL: APPROACHES TO THE STUDY OF DISCIPLINES

Genr 1

Chubin, Daryl E. "The Conceptualization of Scientific Specialties," Sociological Quarterly, 17 (Autumn, 1976), 448-76.

"State of the art" review outlines different approaches to social and intellectual factors considered in studies of scientific specialties. A "demographic component" to such studies is introduced through discussion of the effect of ideas and scientists "marginal" to a specialty (the movement of ideas from the periphery to the center of specialty, the migration of scientists between research areas).

Genr 2

Cole, Stephen; Cole, Jonathan and Dietrich, Lorraine. "Measuring the Cognitive State of Scientific Disciplines," in Toward a Metric of Science, Y. Elkana, et. al. (eds.) New York: John Wiley and Sons, 1978.

for annotation see Bioc 5

Genr 3

Edge, David O. and Mulkay, Michael J. "Case Studies of Scientific Specialties," working paper, University of Edinburgh: Science Studies Unit, 1974.

Reviews case studies of six scientific specialties: radio astronomy, psychology, phage biology, physical chemistry, x-ray protein crystallography, bacteriology. Compares several social and intellectual factors that affected the development of these disciplines and specialties: marginal innovations; mobility; initial "discovery" in research context, or cumulative development in academic setting; formation of social groupings to explore original discovery; access to graduate students; exchange of information within established disciplines; conflict with established or "parent" discipline; creation of a new journal; central problem and single "audience"; blocked career structure. (Similar to chapter in Astronomy Transformed, see Astr 2).

Genr 4

Garfield, Eugene; Malin, Morton V. and Small Henry. "Citation Data as Science Indicators," in Toward A Metric of Science, Y. Elkana et. al. (eds.) New York: John Wiley and Sons, 1978.

for annotation see Biom 8

Genr 5

Gilbert, G. Nigel and Woolgar, Steve. "The Quantitative Study of Science: An Examination of the Literature," Science Studies, 4 (November, 1974), 79-94.

Two types of quantitative analysis of growth and change in science are reviewed. The description-prediction method begins with available statistics on science, selects a mathematical function to describe the data, then makes predictions by extrapolation. The hypothesis-testing approach makes an hypothesis about processes in science, and formulates a mathematical explanation as the hypothesis is explored. The authors find the second approach to be the most effective method of deriving explanations of statistical data. They highlight a need for detailed studies of scientific specialties, which will generate hypotheses that account for significant variations missed when averaging over the whole of science.

Genr 6

Griffith, Belver C. and Mullins, Nicholas C. "Coherent Social Groups in Scientific Change," *Science*, 177 (September 15, 1972), 959-64.

for annotation see Bioc 8

Genr 7

Krauze, T. R. and McGinnis, R. "A Matrix Analysis of Scientific Specialties and Careers in Science" *Scientometrics*, 1 (August, 1979), 419-44.

Introduces the concept of "scientific space," which provides a mathematical structure for exploring connections among scientific articles and their authors. Includes examination of how the concept may be applied to the study of scientific specialties. The authors suggest "Within our approach to scientific space we should be able to reconstruct, on the basis of quantitative data and purely formal manipulations, not only the location of specialties within the wider disciplinary area but also their emergence, development and decline."

Genr 8

Law, John. "The Development of Specialties in Science: The Case of X-ray Protein Crystallography," in *Perspectives on the Emergence of Scientific Disciplines*, G. Lemaine et al. (eds.) Chicago: Aldine, 1976.

for annotation see Bioc 12

Genr 9

Lemaine, Gerard, et al. (eds.) *Perspectives on the Emergence of Scientific Disciplines*. Chicago: Aldine, 1976.

Collection of studies of disciplines, and writings on the theory and methodology of such studies. Introductory essay by the editors outlines the basic assumption of the collected work: in order to understand scientific development, a wide ranging and comparable set of questions must be developed and answered for a variety of disciplines. The questions will derive from several problematic spheres: "internal intellectual processes, internal social processes, external intellectual factors, immediate institutional context, specific economic and political factors, diffuse social influences."

Genr 10

Mulkay, M. J.; Gilbert, G. N. and Woolgar, S. "Problem Areas and Research Networks in Science," Sociology 9 (May, 1975), 187-203.

Examines the social and intellectual processes involved in emergence, growth and decline of scientific research networks and their associated problem areas. Identifies three phases of development: (1) exploratory phase, characterized by lack of effective communication and imprecise definition of problems; (2) rapid growth phase, characterized by increasing social and intellectual integration, made possible by improved communication; (3) final phase, characterized by the decline of the network and the movement of participants to new areas of scientific opportunity.

Genr 11

Narin, Francis. Evaluative Bibliometrics: The Use of Citation Analysis in the Evaluation of Scientific Activity. New Jersey: Computer Horizons, Inc., 1976.

for annotation see Biol 21

Genr 12

Price, Derek J. de Solla. "Citation Measures of Hard Science, Soft Science, Technology, and Nonscience," in Communication Among Scientists and Engineers, Carnot E. Nelson and Donald K. Pollack (eds.) Lexington, Massachusetts: D. C. Heath and Co., 1970.

Citation data show two "overlapping populations" of references: a fairly uniform citation rate to all available literature, and an increased citation rate to recent papers (immediacy effect). Recent, frequently cited papers indicate the research front of a field. A comparison index of papers in several disciplines shows a hierarchy, by percentage of references dated within the last five years. This hierarchy parallels intuitive notions of hard and soft science: physics and chemistry journals show the highest percentage of recent references (60-70%), social science journals cluster around 40%, and nonscience fields (literature, history) show almost no research front, but cite older material. Technology papers do not have the citation characteristics of research papers. Price suggests that "hard science, soft science, technology, and nonscience may all be different social systems," and each system may have unique processes of publication and communication.

Genr 13

Small, Henry and Griffith, Belver C. "The Structure of Scientific Literatures I. Identifying and Graphing Specialties," Science Studies, 4 (November, 1974), 17-40.

for annotation see Biom 18

Genr 14

Storer, Norman. "Relations Among Scientific Disciplines," in The Social Context of Research, Saad Z. Nagi and Ronald G. Corwin (eds.) New York: Wiley Interscience, 1972.

for annotation see Biol 28

Genr 15

Sullivan, Daniel; White, D. Hywel and Barboni, Edward J. "Co-Citation Analysis of Science: An Evaluation," Social Studies of Science, 7 (May, 1977), 223-40.

for annotation see Phys 79

Genr 16

Van Den Daele, Wolfgang and Weingart, Peter. "Resistence and Receptivity of Science to External Direction: the Emergence of New Disciplines Under the Impact of Science Policy," In Perspectives on the Emergence of Scientific Disciplines, G. Lemaine et al.(eds.), Chicago: Aldine, 1976.

Outlines a theoretical framework for examining the impact of science policy on the development of science, particularly on the development of specialties which have social goals as their focus. Suggests that the resistance or receptivity of science to political direction is linked to internal cognitive and institutional conditions. The study of science as an intellectual enterprise and as a system of social action identifies variations among specialties; these variations mediate the influence of external direction. A model is proposed to assist in the design of comparative case studies of disciplines under external influence.

Genr 17

Whitley, Richard. "Umbrella and Polytheistic Scientific Disciplines," Social Studies of Science, 6 (September, 1976), 471-98.

Distinguishes three units of scientific organization--research areas, specialties and disciplines--and focuses on disciplines as "the unit which commonly institutionalizes research work into societal structures." Suggests that there are two types of disciplines: in "polytheistic" disciplines scientific work is organized around divergent views of the discipline; in "umbrella" disciplines research is predominantly organized at the specialty and research area levels, with the discipline acting as a loose holding organization for diverse specialties. Investigates differences between the two types of disciplines in their processes of elite formation and their bases of authority, and examines how these differences affect training, recruitment, and allocation of resources.

Genr 18

Woolgar, S. W. "The Identification and Definition of Scientific Collectivities," in Perspectives on the Emergence of Scientific Disciplines, G. Lemaine et al. (eds.) Chicago: Aldine, 1976.

for annotation see Astr 13

GLOSSARY OF INDEX TERMS

attitudes and values: ethical considerations in research; conflicts between social, professional and business obligations; personal beliefs, scientific norms.

career patterns: factors influencing allocation of academic positions; relationships between education and career choice; characteristics of career advancement; scientists in organizations; sectoral employment trends; manpower models; mobility; (see also **graduate education**).

competition: function of competition in research; priority conflicts; openness, secrecy; professional/amateur; (see also **recognition and reward**).

development of disciplines and specialties: emergence, growth, decline of fields -- intellectual, technical and social (including "external") factors; demographic features.

discipline comparisons: denotes entries which address more than one discipline.

discipline organization: applications of organization theory to social and intellectual structure of disciplines; organization and management of research; structure of academic departments.

discovery process: social and intellectual conditions of innovation; psychology of science, personal styles.

education, graduate education: role of students in teaching and research; faculty/student relationships; field characteristics of education; success/attrition; enrollment patterns; effects of education on individual productivity and career development; effects of changes in funding; (see also **career patterns**).

funding of research: government support for research and academic science; peer review process; role of private foundations; field differences in funding.

information exchange: formal/informal communication patterns; modes and forms of communication; role of communication networks; development of new information systems; international information flow; (see also **publication practices**).

national comparisons: denotes items which include discussion of science in other countries, and comparisons between countries.

paradigm characteristics: field codification and consensus as factors in conduct and evaluation of research, social organization, academic structure and style of education, publication and citation patterns, funding levels.

performance of research: team and group research; field characteristics in organization of work; effects of discipline charactistics; role of technique, theory, instrumentation; effect on research of organizational settings and other external factors.

productivity: quantity and quality of research output; professional activities; factors influencing publication; predictors of productivity.

productivity -- age: items dealing specifically with age and productivity.

professional associations: history, development, organization, functions and social structure of professional associations.

publication practices: editorial policies; review and selection procedures; structure of editorial boards, "gatekeeping" functions; trends in acceptance rates; (see also **information exchange**).

recognition and reward: peer acknowledgement of scientific contributions; scientific norms and the function of recognition; standards and norms of excellence; accumulative advantage; (see also **competition**).

social stratification: status structure of science; measures of success and eminence; allocation of leadership; prestige of educational institutions; discipline hierarchies.

structure of literature: general bibliometric (citation) studies, including some content analysis.

structure of literature -- specialty groups: specialty structure of scientific literature; social and intellectual characteristics of clusters of interrelated literature.

structure of literature -- citation rates: use of citation counts in evaluation; quantity/quality relationships; time factors in citation rates; growth and obsolescence of literature.

structure of literature -- journal influence: characteristics of journals and inter-journal citation rates; hierarchies of referencing patterns.

university ratings: factors influencing prestige and quality ratings of universities and departments; methods and measures for quality ratings.

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  - Physics (Phys): 12 (Chem 12), 26 (Bioc 6), 37, 54 (Chem 39), 63, 69 (Chem 45), 77 (Biol 27)
- Mathematics (Math): 4 (Chem 12), 7 (Bioc 6), 25 (Astr 6), 34 (Biol 27)
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  - Economics (Econ): 5 (Bioc 6), 14
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  - Sociology (Soci): 12, 36 (Chem 39), 43 (Chem 45), 51 (Econ 14)

information exchange

- Bioscience
  - Biology, General (Biol): 9, 17, 19, 24
  - Biochemistry and Molecular Biology (Bioc): 18 (Biol 17), 21, 22, 25
  - Biomedicine (Biom): 2, 17 (Bioc 22)
- Physical Science
  - Chemistry (Chem): 26 (Biol 9), 37, 53 (Bioc 22), 65
  - Earth and Space Sciences (E&Sp): 4, 10
  - Physics (Phys): 9, 11, 19, 21, 27, 29, 41 (Biol 9), 46, 49 (Engr 11), 51, 57 (Engr 15)
- Mathematics (Math): 8 (Socl 21), 15, 17 (Biol 9)
- Engineering (Engr): 11, 13, 15, 25
- Social Science
  - Economics (Econ): 9
  - Political Science (Poli): 1
  - Psychology (Psyc): 4 (Socl 9), 10, 15, 17
  - Sociology (Socl): 9, 12, 21, 38, 40, 62

national comparisons

- Bioscience
  - Biology, General (Biol): 5, 7
  - Biomedicine (Biom): 6, 7 (Biol 5)
- Physical Science
  - Astronomy (Astr): 7
  - Chemistry (Chem): 6, 19, 21 (Biol 5), 23 (Biol 7)
  - Earth and Space Sciences (E&Sp): 1
  - Physics (Phys): 5 (Chem 6), 29, 30 (Biol 5), 33, 34, 35 (Biol 7), 36, 49 (Engr 11), 83
- Mathematics (Math): 3, 10, 12 (Biol 5)
- Engineering (Engr): 7 (Biol 5), 11
- Social Science
  - Political Science (Poli): 3 (Chem 6)
  - Psychology (Psych): 3
  - Sociology (Socl): 4 (Chem 6), 47, 55

paridigm characteristics

Bioscience
- Biology, General (Biol): 7, 12, 25, 28, 30 (Socl 63), 32
- Biochemistry and Molecular Biology (Bioc): 4, 5

Physical Science
- Chemistry (Chem): 5, 6, 7, 8, 15, 16 (Bioc 4), 17 (Bioc 5), 23 (Biol 7), 29 (Biol 12), 31, 38, 39, 40, 44, 45, 46, 47, 48 (Biol 25), 60 (Biol 28), 62, 63, 64 (Socl 63), 69 (Biol 32)
- Earth and Space Sciences (E&Sp): 5 (Chem 15), 6 (Bioc 5), 20, 22 (Biol 28)
- Physics (Phys): 4 (Chem 5), 5 (Chem 6), 6 (Chem 7), 7 (Chem 8), 20 (Chem 15), 22 (Bioc 4), 25 (Bioc 5), 35 (Biol 7), 44 (Biol 12), 53 (Chem 38), 54 (Chem 39), 55 (Chem 40), 65, 68 (Chem 44), 69 (Chem 45), 70 (Chem 46), 71 (Biol 25), 78 (Biol 28), 87 (Chem 62), 88 (Chem 63), 89 (Socl 63), 91 (Biol 32)

Mathematics (Math): 5 (Chem 15), 6 (Bioc 5), 15, 20 (Biol 12), 23 (Chem 31), 33 (Biol 25), 36 (Biol 28), 37 (Biol 32)

Engineering (Engr): 19 (Biol 25)

Social Science
- Economics (Econ): 14, 15 (Biol 25), 23 (Biol 28), 26 (Chem 62), 27 (Chem 63), 28 (Socl 63)
- Political Science (Poli): 1, 2 (Chem 5), 3 (Chem 6), 4 (Chem 7), 5 (Chem 8), 13 (Chem 31), 16 (Chem 38), 17 (Chem 39), 18 (Chem 40), 19 (Chem 44), 20 (Chem 45), 21 (Chem 46), 22 (Chem 47), 23 (Econ 14), 24 (Biol 25), 28, 29 (Biol 28), 30 (Socl 63)
- Psychology (Psyc): 6 (Chem 15), 7 (Bioc 4), 8 (Bioc 5), 20, 29 (Econ 14), 30 (Biol 25), 37 (Biol 28), 40 (Socl 63), 41 (Biol 32)
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performance of research

- Bioscience
  - Biology, General (Biol): 6, 10, 12, 13, 18, 31
  - Biochemistry and Molecular Biology (Bioc): 12, 21
- Physical Science
  - Astronomy (Astr): 9
  - Chemistry (Chem): 8, 10, 22 (Biol 6), 27 (Biol 10), 29 (Biol 12), 30 (Biol 13), 31, 32, 40, 49, 63, 68 (Biol 31)
  - Physics (Phys): 7 (Chem 8), 31 (Biol 6), 34, 42 (Biol 10), 44 (Biol 12), 45 (Biol 13), 55 (Chem 40), 81, 82, 84, 88 (Chem 63), 90 (Biol 31)
- Mathematics (Math): 11, 13 (Biol 6), 15, 18 (Biol 10), 20 (Biol 12), 21 (Biol 13), 22, 23 (Chem 31), 24 (Chem 32), 26
- Engineering (Engr): 8 (Biol 6)
- Social Science
  - Economics (Econ): 27 (Chem 63)
  - Political Science (Poli): 5 (Chem 8), 13 (Chem 31), 14 (Chem 32), 18 (Chem 40)
  - Psychology (Psyc): 14 (Biol 6)
  - Sociology (Socl): 6 (Chem 8), 37 (Chem 40), 38, 61 (Chem 63)

productivity

- Bioscience
  - Biology, General (Biol): 16
  - Biochemistry and Molecular Biology (Bioc): 2, 13, 14, 16
  - Biomedicine (Biom): 3, 14, 16
- Physical Science
  - Chemistry (Chem): 10, 32, 33, 50, 51
  - Physics (Phys): 23, 80
- Mathematics (Math): 24 (Chem 32)
- Social Science
  - Economics (Econ): 12, 19
  - Political Science (Poli): 14 (Chem 32)
  - Psychology (Psyc): 28, 32
  - Sociology (Socl): 13, 31

productivity -- age

- Bioscience
  - Biology, General (Biol): 1, 32
  - Biochemistry and Molecular Biology (Bioc): 1
- Physical Science
  - Astronomy (Astr): 3
  - Chemistry (Chem): 1 (Biol 1), 15, 69 (Biol 32)
  - Earth and Space Sciences (E&Sp): 2 (Bioc 1), 5 (Chem 15)
  - Physics (Phys): 1 (Biol 1), 3 (Bioc 1), 11, 20 (Chem 15), 91 (Biol 32)
- Mathematics (Math): 1 (Biol 1), 5 (Chem 15), 35, 37 (Biol 32)
- Engineering (Engr): 1 (Bioc 1), 2
- Social Science
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  - Psychology (Psyc): 2 (Bioc 1), 6 (Chem 15), 41 (Biol 32)
  - Sociology (Socl): 1 (Bioc 1), 14, 16 (Chem 15), 64 (Biol 32)

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- Physical Sciences
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- Engineering (Engr): 17
- Social Science
  - Economics (Econ): 10, 17
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- Physical Science
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  - Economics (Econ): 3, 25
  - Political Science (Poli): 2 (Chem 5), 7 (Econ 3), 22 (Chem 47)
  - Psychology (Psyc): 16, 22, 23
  - Sociology (Socl): 3 (Chem 5), 10 (Econ 3), 33 (Psyc 22), 34 (Psyc 23), 50 (Chem 47), 59

recognition and reward

- Bioscience
  - Biology, General (Biol): 7, 13, 28, 30 (Socl 63), 31
  - Biochemistry and Molecular Biology (Bioc): 4, 13, 14
  - Biomedicine (Biom): 9, 12, 13

- Physical Science
  - Astronomy (Astr): 11
  - Chemistry (Chem): 11, 16 (Bioc 4), 23 (Biol 7), 30 (Biol 13), 32, 34 (Biom 12), 44, 50, 52, 60 (Biol 28), 64, 68 (Biol 31)
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- Mathematics (Math): 15, 21 (Biol 13), 24 (Chem 32), 36 (Biol 28)

- Engineering (Engr): 5, 6, 9

- Social Science
  - Economics (Econ): 12, 16, 20, 23 (Biol 28), 24, 28 (Socl 63)
  - Political Science (Poli): 14 (Chem 32), 19 (Chem 44), 28, 29 (Biol 28), 30 (Socl 63)
  - Psychology (Psyc): 5, 7 (Bioc 4), 37 (Biol 28), 38, 39, 40 (Socl 63)
  - Sociology (Socl): 13, 18 (Bioc 4), 31, 40, 42 (Chem 44), 58 (Biol 28), 63

social stratification

- Bioscience
  - Biology, General (Biol): 24, 29
  - Biomedicine (Biom): 2, 19

- Physical Science
  - Astronomy (Astr): 7
  - Chemistry (Chem): 2, 13, 52
  - Earth and Space Sciences (E&Sp): 3, 11
  - Physics (Phys): 9, 13 (E&Sp 3), 18, 19, 21, 62, 92

- Social Science
  - Economics (Econ): 19, 22
  - Political Science (Poli): 11, 26, 27, 28
  - Psychology (Psyc): 5, 26, 38, 39
  - Sociology (Socl): 11, 27, 47, 49, 54

structure of literature

- Bioscience
  - Biology, General (Biol): 5, 22
  - Biochemistry and Molecular Biology (Bioc): 20 (Biol 22)
  - Biomedical (Biom): 7 (Biol 5)
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  - Earth and Space Sciences (E&Sp): 1, 15
  - Physics (Phys): 17, 30 (Biol 5), 49 (Engr 11), 61, 64, 65, 67 (Biol 22), 74, 75 (Econ 21), 84
- Mathematics (Math): 12 (Biol 5), 28, 31 (Biol 22)
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- Social Science
  - Economics (Econ): 16, 21
  - Political Science (Poli): 1, 11
  - Psychology (Psyc): 13, 31, 36 (Econ 21)
  - Sociology (Socl): 12, 56 (Econ 21)

structure of literature -- specialty groups

- Bioscience
  - Biology, General (Biol): 20
  - Biochemistry and Molecular Biology (Bioc): 3, 23
  - Biomedicine (Biom): 4, 8, 18
- Physical Science
  - Chemistry (Chem): 14 (Bioc 3)
  - Physics (Phys): 14 (Bioc 3), 16 (Engr 4), 32 (Biom 8), 76 (Biom 18), 79, 80, 86
- Engineering (Engr): 4
- Social Science
  - Sociology (Socl): 17

structure of literature -- citation rates

- Bioscience
  - Biology, General (Biol): 4
  - Biomedicine (Biom): 12
- Physical Science
  - Chemistry (Chem): 34 (Biom 12)
  - Earth and Space Sciences (E&Sp): 9, 12, 16, 20, 21
  - Physics (Phys): 48 (Biom 12)

structure of literature -- citation rates (continued)

Social Science
- Economics (Econ): 22
- Psychology (Psyc): 21, 26, 32
- Sociology (Socl): 45, 46, 48

structure of literature -- journal influence

Bioscience
- Biology, General (Biol): 15, 21
- Biochemistry and Molecular Biology (Bioc): 15 (Biol 15)
- Biomedicine (Biom): 15

Physical Science
- Chemistry (Chem): 41 (Biol 15), 42 (Biol 21)
- Earth and Space Sciences (E&Sp): 14 (Biol 15), 19 (Biol 21)
- Physics (Phys): 47, 52 (Socl 32), 58 (Biol 15), 66 (Biol 21)

Mathematics (Math): 29 (Biol 15), 30 (Biol 21)

Engineering (Engr): 16 (Biol 15)

Social Science
- Economics (Econ): 2, 9
- Psychology (Psyc): 25 (Biol 15), 27 (Biol 21)
- Sociology (Socl): 32

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Bioscience
- Biology, General (Biol): 2, 11

Physical Science
- Chemistry (Chem): 3 (Biol 2), 7, 9, 28 (Biol 11)
- Physics (Phys): 2 (Biol 2), 6 (Chem 7), 8 (Chem 9), 15 (Econ 4), 28, 43 (Biol 11), 54 (Chem 39)

Mathematics (Math): 2 (Biol 2), 19 (Biol 11)

Engineering (Engr): 2

Social Science
- Economics (Econ): 4, 13, 19
- Political Science (Poli): 4 (Chem 7), 6 (Chem 9), 8 (Econ 4), 17 (Chem 39)
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Tuckman, Howard P.	Econ 24
Van Den Daele, Wolfgang	Genr 16
Van Rossum, Wouter	Socl 59
Vaughn, Ted R.	Socl 28
Viksnins, G. J.	Econ 2
Vlachy, Jan	Phys 82, Phys 83, Phys 84
Wade, Nicholas	Astr 11
Waldhart, T. J.	Engr 25
Warner, Deborah Jean	Astr 12
Watson, James D.	Bioc 24
Weart, Spencer R.	Phys 85
Weber, J. A.	Econ 25
Weingart, Peter	Genr 16
Westerdiep, Anne	Biol 18
White, D. Hywel	Phys 79 (Genr), Phys 80, Phys 86
White, Kenneth J.	Econ 20
Whitley, Richard D.	Biol 29, Genr 17
Whittemore, C. L.	Psyc 13
Wilkes, John M.	Chem 62, Chem 63 (both articles also deal with Phys, Econ, Socl)
Williams, Anthony T.	Phys 63
Wispe, lauren	Psyc 38, Psyc 39
Wolfle, D.	Psyc 33
Woolf, Patricia	Biol 13, Astr 13, Astr 14
Woolgar, S. W.	Biom 13, Astr 13 (Genr), Astr 14, Genr 5, Genr 10
Worboys, Michael	Biom 20
Yermish, Ira	Engr 26
Yoels, Brenda G.	Socl 63
Yoels, William C.	Socl 62, Socl 63
Zaltman, Gerald	Phys 51
Zenzen, Michael	Chem 65
Zinberg, Dorothy	Chem 66, Chem 67
Zuckerman, Harriet A.	Biol 31 (Chem, Phys), Biol 32 (Chem, Phys, Math, Socl, Psyc), Socl 15, Phys 92

APPENDIX I

DISTRIBUTION OF ENTRIES BY DISCIPLINE AND TOPIC

	BIOLOGY	BIOCHEMISTRY	BIOMEDICINE	ASTRONOMY	CHEMISTRY	EARTH & SPACE	PHYSICS	MATHEMATICS	ENGINEERING	ECONOMICS	POLITICAL SCIENCE	PSYCHOLOGY	SOCIOLOGY
ATTITUDES AND VALUES	2		2		5	2	2	1	9	2	1	3	3
CAREER PATTERNS		4	2	3	6		5	1	7	2			7
COMPETITION	2	1	3	3	3		6	2		1	1	1	1
DEVELOPMENT OF DISCIPLINES & SPECIALTIES	2	8	2	8	5	3	4	6	1	1	1	4	13
DISCIPLINE ORGANIZATION	1		3		5		5		6	3	5	1	6
DISCOVERY PROCESS	2	2	2	3	4	4	8	2		3	1	2	3
EDUCATION	2	4		2	7		6	3	5	5	2	5	3
FUNDING OF RESEARCH	1	3	3	6	6	2	7	4	1	2	4	1	4
INFORMATION EXCHANGE	4	4	2		4	2	11	3	4	1	1	4	6
NATIONAL COMPARISONS	2		2	1	4	1	9	3	2		1	1	3
PARADIGM CHARACTERISTICS	6	2			23	4	22	8	1	6	18	9	25
PERFORMANCE OF RESEARCH	6	2		1	12		12	10	1	1	4	1	4
PRODUCTIVITY	1	4	3		5		2	1		2	1	2	2
• AGE	2	1		1	3	2	5	4	2	2		3	4
PROFESSIONAL ASSOCIATIONS					4		2		1	2	2	1	2
PUBLICATION PRACTICES					2		2			2	3	3	6
RECOGNITION AND REWARD	5	3	3	1	12	2	17	4	3	6	5	6	7
SOCIAL STRATIFICATION	2		2	1	3	2	7			2	4	4	5
STRUCTURE OF LITERATURE	2	1	1		6	2	10	3	4	2	2	3	2
• SPECIALTY GROUPS	1	2	3		1		7		1				1
• CITATION RATES	1		1		1	5	1			1		3	3
• JOURNAL INFLUENCE	2	1	1		2	2	4	2	1	2		2	1
UNIVERSITY RATINGS	2				4		7	2	1	3	4	1	5

APPENDIX II

SELECTED READINGS IN THE SOCIAL STUDIES OF SCIENCE

Barber, Bernard, and Hirsch, Walter (eds.). *The Sociology of Science*. New York: Free Press of Glencoe, 1962.

Ben-David, Joseph. *The Scientist's Role in Society: A Comparative Study*. Englewood Cliffs, New Jersey: Prentice Hall, 1971.

Blume, Stuart S. (ed.). *Perspectives in the Sociology of Science*. London: John Wiley and Sons, 1977.

Durbin, Paul T. (ed.). *A Guide to the Culture of Science, Technology and Medicine*. New York: The Free Press, 1980.

Elkana, Yehuda, *et al*. (eds.). *Toward a Metric of Science: The Advent of Science Indicators*. New York: John Wiley and Sons, 1978.

Holton, Gerald. *The Scientific Imagination: Case Studies*. Cambridge: Cambridge University Press, 1978.

Kaplan, Norman (ed.). *Science and Society*. Chicago: Rand McNally, 1965.

Kuhn, Thomas. *The Structure of Scientific Revolutions*. 2nd edition. Chicago: University of Chicago Press, 1970.

Lemaine, Gerard, *et al*. (eds.). *Perspectives on the Emergence of Scientific Disciplines*, Chicago: Aldine, 1976.

Mendelsohn, Everett; Weingart, Peter and Whitley, Richard (eds.). *The Social Production of Scientific Knowledge*. Dordrecht: D. Reidel Publishing Co., 1977.

Merton, Robert K. *The Sociology of Science*. Edited and with introduction by Norman W. Storer. Chicago: University of Chicago Press, 1973.

Merton, Robert K., and Gaston, Jerry (eds.). *The Sociology of Science in Europe*. Carbondale: Southern Illinois University Press, 1977.

Price, Derek J. de Solla. *Little Science, Big Science*. New York: Columbia University Press, 1963.

Spiegel-Rosing, Ina and Price, Derek J. de Solla (eds.). *Science, Technology and Society: A Cross Disciplinary Perspective*. London: Sage Publications, 1977.

Storer, Norman (ed.). *The Social System of Science*. New York: Holt, Rinehart and Winston, 1966.